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BRITISH FOREST-TREES.

LONDON:
PRINTED BY S. & J. BENTLEY, WILSON, AND FLEY,
Bangor House, Shoe Lane.

A

HISTORY

OF

BRITISH FOREST-TREES,

INDIGENOUS AND INTRODUCED.

BY

PRIDEAUX JOHN SELBY, F.L.S., M.W.S., ETC.



ILLUSTRATED BY NEARLY 200 ENGRAVINGS.

LONDON:
JOHN VAN VOORST, PATERNOSTER ROW;
M.DCCC.XLII.

PREFACE.

WHETHER a work upon the plan adopted by the Author of the following pages be calculated to prove useful, or to supply a deficiency in the list of those works relating to dendrology which we already possess, must be left to the opinion and decision of that public to which his volume is now respectfully submitted. In claiming its indulgence, and as some apology for the present attempt, he may, perhaps, be permitted to remark, that, of the various works which bear more or less directly upon the subject, the majority differ in their scope and character from the one which now solicits the patronage of the public. Most of these treatises are restricted in their design, and are confined to certain departments of dendrology, and operations connected with the general culture and management of Forest Trees, and do not enter upon the particular history, or any detailed account, of individual species. Of this description are the works of Pontey, Menteith, Nichol, Sang, Billington, and various

others, in all of which the operations of planting, thinning, pruning, and nursery culture, constitute the permanent features, leaving the history of the species to which the above-mentioned operations are meant to refer but slightly touched upon, or forming a very secondary portion of their contents.

The classic "Sylva" of Evelyn, and the valuable "Arboretum et Fruticetum Britannicum," of Loudon, are, however, works to which the present volume approaches nearer in the general outline of its plan; but as the former was written upwards of a century and a half ago, and at a time when several trees, now naturalized and extensively cultivated in Britain, were but little known or recently introduced; and as the latter embraces a much wider field of investigation, besides being voluminous in size and costly in price, and consequently in a great measure confined to the libraries of the opulent, it did not appear to the Author that he was trenching upon ground, either so fully occupied or exhausted previously, as to render another work, (connected as it is with a subject of such importance as the growth and management of British timber,) altogether unnecessary and uncalled for.

His object, therefore, has been to give, in as concise a manner as seemed consistent with the nature of the subject, such an account of the various forest trees at present cultivated in Britain as might form a volume of informa-

tion interesting to the general reader, and at the same time, one useful, as a sort of manual, to the planter and those interested in arboriculture. With this view, in addition to the historical account of each species, the useful and ornamental properties of the various trees have been mentioned, and such observations made upon their culture, or upon what may be termed the scientific departments of dendrology, as seemed consistent with his own experience, and with that of many others engaged in similar pursuits. Under the denomination of British Forest Trees, it must be observed, are included not only those indigenous to the kingdom, but also such as have been introduced at periods more or less remote, and which since their introduction have been extensively propagated, either for the quality and value of the timber they produce, or for their ornamental properties, whether as individual objects, or in combination and grouped with other trees. It may, perhaps, be objected, that a few species not generally recognized as Forest trees, have been improperly admitted into the following work; such as the Mountain Ash (*Sorbus aucuparius*), the Holly (*Ilex aquifolium*), and the White Thorn (*Cratægus oxyacantha*); to this the Author would venture to reply, that though aware of the secondary rank of these trees in point of dimensions, when compared with the greater denizens of the forest, he felt that the prominent station they occupy

in the ornamental and picturesque department of our native Sylva was sufficient to compensate for this defect, and to entitle them to the situation in which they have been placed. Indeed, had he not been apprehensive of carrying the principle too far, he would have wished to have added others to the list, particularly the Bird-Cherry (*Cerasus padus*), one of our most ornamental flowering trees of inferior growth, and the Scotch or Alpine Laburnum (*Cytisus laburnum var. alpinus*), a variety attaining much larger dimensions than the common species, and which produces, in the opinion of Mr. Matthew, the author of a valuable treatise on Naval Timber, wood of greater value than any other British tree.

In speaking of the various important operations connected with the management of timber, the Author may remark, that he does so with the experience of nearly forty years, during which period he has not only been a planter to some extent, but has also devoted much time and attention to the culture of his trees; his observations, therefore, may be considered the result of practical and oft-renewed investigation, conducted, so far as he was able, in accordance with the principles of vegetable physiology. It will not, therefore, much surprise his readers, that he should differ from Pontey and his followers, in regard to the pruning of forest trees, seeing that the denuding system of that writer is directly opposed to such principles,

and that so far from contributing to promote a more rapid increase or a greater deposition of the woody fibre, it tends, on the contrary, to check materially the growth and vigour of the tree to which it is applied. Even the system of *shortening* in, or curtailment of the lateral branches, a mode of pruning now very generally adopted, though far preferable to the other, and when judiciously used frequently of decided advantage, may easily be carried to excess, as the author has seen in repeated instances. In short it is seldom that trees planted in mass, or within a short distance of each other, require aid or assistance from the pruning knife, or are even benefited by the abscission of their lateral branches—the difficulty, on the contrary, is to induce trees so situated, to retain these necessary and efficient members in requisite numbers, and for a sufficient length of time to ensure a healthy and vigorous growth and a rapid deposition of the woody fibre. One of the most efficient modes of producing such an effect, is the timely application of another important operation, viz., that of thinning, the advantage of which, when properly administered, the Author has endeavoured to impress upon his readers in various parts of his work.

With respect to the planting of forest trees, he would briefly remark, that he is not an advocate for the trenching of the ground previous to that operation, being con-

vinced from personal observation and experience, that no adequate or remunerating advantage, either by a more rapid growth of the tree or an improvement in the quality of the timber is obtained, sufficient to compensate for the great additional expense incurred, without taking into account the difficulty in adopting it in many districts well adapted to the rearing of wood, or where plantations are made upon that extensive scale, now so prevalent throughout the kingdom. In regard to the statistics of the various trees described, the Author has been obliged, from the restricted extent of his volume, to confine his remarks within narrow limits; this he cannot but regret, as he is aware the omission must prove a disappointment to many of his readers; it is, however, satisfactory to be able to refer them to so able a work as the "Arboretum et Fruticetum Britannicum," in which the statistical information respecting its various contents are generally full and satisfactory; Lauder's edition of "Gilpin's Forest Scenery" also contains much interesting information of this kind, respecting the various trees noticed and enumerated in the pages of that delightful work.

The Wood Cuts, illustrative of the trees, have in most instances been executed from drawings of specimens that appeared to convey a correct idea of the usual growth and appearance of the species, as this was thought of more importance and better suited to the intention of the work

than the selection of portraits of remarkable trees, which, though they might have added to the beauty, would have failed in conveying that impress of truth and fidelity which it was the object of the Author to stamp upon the delineations. In regard to their execution, he scarcely anticipates a single objection; and he trusts, that whatever may be the decision of the public as to the written contents of the volume, its meed of praise and approval will be liberally bestowed upon the artist who has succeeded so successfully in embellishing its pages.

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ERRATA.

Page 22, *line* 7, *for* scarce *read* scarcely.
„ 159, „ 10, *for* Tallowden *read* Fallowden.
„ 383, „ 32, *for* variegata *read* variegatis.

BRITISH FOREST-TREES.



Nat. Ord. Tiliaceæ.

LINN. *Syst. Polyandria Monogynia.*

Tilia Europæa. LINN.

COMMON, OR EUROPEAN LIME-TREE.

Tilia Europæa.

LINN. syst. 733.
SMITH's Eng. Flor. iii. f. 16.
LOUDON's Arb. Brit. part III. ch. xviii. p. 364.

Specific Characters.—Nectaries wanting, leaves smooth, except a woolly tuft at the origin of the veins beneath, cordate, acuminate and serrated, twice the length of the footstalks. Cymes many-flowered, the capsule coriaceous and downy.



If we possess no evidence sufficiently conclusive to prove that the Lime-tree in any of its forms is truly indigenous in Britain, we have at least enough to show that it has long been naturalized, and that its introduction must have taken place at a very distant period; for upon referring to the earlier authors, such as Turner, Gerard, &c., we find it (in the form of *T. E. microphylla)* spoken of as a well-known and, in their estimation, apparently as a native tree. Evelyn also appears to have viewed the *T. E. microphylla* in this light, for speaking of the *Til. Europæa* of authors, he says, "We send, commonly, for this tree, into Flanders and Holland, which, indeed, (that is *T. Europæa,)* grows not so naturally wild with us, to our expensive cost, while our woods do, in some places, spontaneously produce

them, and though of somewhat a smaller leaf, yet altogether as good, and apt to be civilized, and made more florid." Trees of a great age and size are also upon record, and many of upwards of one hundred years old are now in existence. Another fact in favour of its being a native in the form of *T. E. microphylla*, is stated by Loudon, in the "Arboretum Britannicum," upon the authority of Edwin Lees, Esq., viz., "that at Shrawley, eight miles north of Worcester, there is a wood, remote from any old dwelling or public road, of above five hundred acres in extent, the greater part of the undergrowth of which is composed of *T. E. microphylla*;" and the same gentleman, in a communication to the Botanical Society of London, mentioned several places in Worcestershire, Herefordshire, Gloucestershire, Monmouthshire, and South Wales, where he considers the Lime to be indigenous, and where he met with many remarkable and aged trees.

Upon this evidence we think that the Lime-tree, in the form of *T. E. microphylla*, may be indigenous, although the larger leaved varieties are not so, and may have been subsequently introduced; it is the form in which we might expect to find it, considering the nature of our climate as compared with that in which the larger leaved varieties are found to prevail in various parts of the European Continent, and the only strong objection against such an inference is, that even under the form of *T. E. microphylla* it only occasionally ripens its seed in England, the perfect maturation of which is considered by dendrologists as one of the surest and truest tests of an indigenous plant. Omitting however, under these circumstances, Britain, as a native habitat, we may state that the geographical distribution of the *T. Europæa* under some of its various forms, embraces a great portion of the middle and north of Europe; thus, that

variety known as the *T. E. platyphylla* (*T. grandifolia* of Smith) is said to prevail in Switzerland, and as far south as Spain, Portugal, and Greece, whilst the other two, known as the *T. Europæa*, and *T. E. microphylla*, are spread over the northern parts of Germany, Denmark, Sweden, Russia, and as far as Siberia. By many botanists several species of *Tilia* are enumerated as inhabitants of Europe, and Sir J. E. Smith makes three distinct species of those cultivated and growing in Britain, viz., *T. Europæa*, *T. grandifolia*, and *T. parvifolia*, the two latter answering to the *T. platyphylla* and *T. microphylla* of other authors; we are, however, inclined to adopt the views and follow the opinion of the author of the "Arboretum Britannicum," and to consider these not as specifically distinct from *T. Europæa*, in its usual form, but as marked varieties, or, as Mr. Loudon designates them, *Races*, originally produced from the seed of one, and which have been kept distinct, and perpetuated by means of layers, grafting, and other artificial modes of propagation; a view we think strongly corroborated by the fact that the seeds of the different kinds, or supposed species, do not always produce plants exactly similar to the trees from which they are gathered, but run into varieties, the seed of *T. E. platyphylla* often producing plants similar in every respect to those of *T. Europæa* (the Common Lime), and so with the other kinds.

The Lime-tree appears to have been held in repute in ancient as well as in modern times, for we learn from Theophrastus that it was known to the Greeks, and Pliny speaks of it as a tree held in high esteem by the Romans, not only for the ornament and shade it afforded, but for the qualities of its wood, and the various purposes to which it was adapted. Nearly two hundred years have elapsed since it became a favourite tree in the formation of avenues

and public walks both in France and England, as we learn from Du Hamel, who observes, "The French, growing tired of the Horse-chesnut for avenues, adopted the Lime for that purpose in the time of Louis the Fourteenth, and accordingly the approaches to the residences of the French, as well as English gentry, of that date, were bordered with Lime trees." Evelyn, who published his Sylva in 1662, also remarks, in his account of the Lime-tree, that "it is a shameful negligence that we are not better provided of nurseries of a tree so choice and universally acceptable." It was also generally planted along the streets of continental as well as English towns, where their width would admit of it, as affording a pleasant shade and protection during the summer heats, and was extensively used in Topiary works, and in that style of gardening called architectural, as it bore cutting with the knife or shears with patience and comparative impunity. Examples of this style still exist in some parts of England, and are frequent upon the Continent, in France, and Holland, where pyramids, arches, and colonnades are formed of this tree, and sometimes produce an imposing effect. In England it appears to have fallen into disrepute about Miller's time, on account, as he states, of its coming late into leaf in spring, and again losing its foliage early in autumn: this objection, however, only holds good when planted in improper soils, or situations unsuited to its constitution. The different mode of laying out grounds at the present æra, having abolished the straight and formal avenues of our predecessors, has greatly curtailed the planting of this tree, and it is now only occasionally used in the formation of public walks, or scattered in small numbers in appropriate situations in the grounds of our gentry.

As an ornamental tree in picturesque gardening, the

Lime is well worth cultivating, as it ranks in the first class, in point of magnitude, frequently attaining a height of eighty or ninety feet, and a trunk corresponding in circumference to such an altitude.*

Its foliage also is elegant, though, perhaps, too uniform in outline for picturesque effect, and, as Gilpin observes, not presenting "those breaks and hollows which the foliage of the most picturesque trees presents, and which is always beautiful." No one, however, we believe, can look at a Lime-tree in full and luxuriant foliage, where sufficient room has been afforded it, and the soil has suited its constitution, without admiring the living pyramid it presents, or pronouncing it amongst the finest and most striking of our forest-trees; and that its character is such, we have only to refer our readers to the magnificent specimens at Moor Park, one of which is so admirably pourtrayed by Mr. Strutt, or to others of great magnitude in England, mentioned by Mr. Loudon; and in Scotland we refer them to those we have oft admired upon the lawn at Inverary Castle, or those which adorn the grounds at Taymouth. Another recommendation possessed by the Lime-tree is the delicious scent of its flowers, which perfume the air to a great distance around: these, from the honied sweets they contain, are irresistibly attractive to the honey-bee, and thousands of other winged insects.

The wood of the Lime-tree, as compared with that of the oak, the ash, and other timber trees, holds but an inferior rank, and is only used in such works as are not to be subject to the alternation of moisture and dryness. In colour it is white, or yellowish white, of a close grain, but soft and very light, and not subject to the attack of worms

* See the dimensions of various Lime-trees enumerated in Loudon's "Arboretum Britannicum," and in Sir T. D. Lauder's edition of Gilpin's "Forest Scenery."

or insects. It is used by musical instrument makers for the sounding boards of pianofortes, &c., as it does not warp under change of temperature or atmosphere. It also forms the best planks for shoemakers and glovers upon which to cut their leather, also paneling for carriages, and is extensively used in the manufacture of toys and Tunbridge ware, and by the Turner for pill-boxes &c., for the apothecaries. As a wood adapted for carving, it is superior to any other we possess; and to justify its claim to this distinction, we have only to instance the exquisite productions of Gibbons, whose carving adorns the mansions of many of our nobility, and is as fresh and sharp as when first from the chisel, though executed nearly two hundred years ago. The bark of the Lime, or at least its interior layers, after being steeped or macerated in water, furnish the material of which our bass mats, so useful for many purposes, are made; these are mostly fabricated in Russia and Sweden, where the fibre is also sometimes manufactured into nets, and in Carniola it is even woven into a coarse cloth for ordinary clothing. The charcoal is used in the manufacture of gunpowder, and is considered as scarcely inferior to that produced by the alder and willow. From the flowers the bees extract a most delicious and highly-flavoured honey, but this can only be procured in a pure and unadulterated state in extensive tracts covered with this tree; such is the case at Kouno, in Lithuania, which is surrounded by a forest of Lime-trees, and where the management of the honey-bee occupies the principal attention of the inhabitants, a full and detailed description of which will be found in the appendix to Sir John Sinclair's "Husbandry of Scotland." When cut over, it shoots freely and grows rapidly, and in a moist, loamy soil forms a productive underwood, either to make into charcoal, or when

large enough, which it generally is after five or six years' growth, to cut into rims and uprights for earthenware and glass crates, and various other minor purposes, where a strong and durable wood is not required.

The Lime-tree in England is almost always propagated by layers, which become sufficiently rooted to be severed from the stock at the end of a year. This mode is adopted for the following reasons: first, that it seldom ripens its seeds in Britain; the second is, that plants raised from seed (which may be obtained in any quantity from the Continent) are, for some years, of very slow growth compared with those raised by layering, and therefore do not make a sufficiently quick return to the nurseryman. If cut in and pollarded, Lime-trees of a considerable age may be transplanted, but they long remain unsightly, and rarely form a fine tree; transplanted of a large size, with all their spray, they seldom succeed, though every attention be bestowed upon the operation.

The soil most congenial to the Lime, and in which it attains its greatest size and finest form, is a rich clayey loam, or the alluvial deposits in low-lying meadows, haughs, the margins of rivers, &c. It also grows well in a light gravelly loam, provided it is sufficiently retentive of moisture, and does not parch or become desiccated by the heats of summer. In retentive clays, and poor tilly soils, it never thrives, but invariably exhibits a yellow, sickly, and stunted appearance; the foliage in such situations, and in atmospheres injurious to it, (such as that saturated with the smoke of pit coal,) is lost at a very early period, whereas that of trees planted in favourable situations, is retained nearly as long as the foliage of the beech-tree, sycamore, and several other trees.

The foliage of the Lime affords a pabulum to the cater-

pillars of many Lepidopterous insects, some of which are confined to it, while others are occasionally found upon other trees; amongst them we may enumerate the *Smerinthus tiliæ* (Lime Hawk moth), *Pygœra bucephala*, *Stauropus fagi*, *Lophopteryx camelina*, *Petasia cassinea*, *Endromis versicolor* (Glory of Kent), *Eriogaster lanestris*, *Hypogymna dispar*, *Leucoma vau nigra*, *Orthosia stabilis*, *Xylina petrificata*, *Miselia Aprilina*, *Acronycta Psi*, *Cosmia trapezina*, *Xanthia citrago*, and of the *Geometrideæ*, *Prosapiaria defoliaria*, *Biston Prodromaria*, *Biston hirtarius*, *Geometra tiliaria*, *Geometra angularia*, *Ourapteryx sambucaria*, and *Hipparchus papilionarius*. It is also infested by *Aphis tiliæ*, and various species of the *Psocidæ* and *Circopidæ*.

Besides the Common Lime-tree in its ordinary form, the following are the principal varieties, or races, generally cultivated; 1st. The Small-leaved European Lime, *T. E. microphylla*, Loud. (the *Til. microphylla* of Ventenat, *Til. parvifolia*, Smith), distinguished from the *Til. Europæa*, by its smaller leaves and slender foot-stalks. This appears to be the male linden-tree of Gerard, the wood of which he states to be harder, more knotty, and yellower in colour than the common kind, and this variety, as we have previously observed, is more likely to be indigenous than any other, being the form or appearance we should expect it to exhibit in a climate like our own. Upon the Continent it prevails in the rocky parts of Sweden, and the hilly districts of the north of Germany: it flowers later than the other kinds, but is equally fragrant, though the flowers are smaller. 2nd. The Broad-leafed European Lime-tree, *Til. Eu. platyphylla*, Loud. (*Til. platyphylla*, Scop., *Til. grandifolia*, Smith); the leaves of this variety are downy beneath, with woolly tufts at the origin of the veins, and larger than those of *Til. Europæa*. The young

branches are also hispid, and the bark of the trunk rougher. The cymes are three-flowered, the fruit downy, turbinate, with five prominent angles. It attains a size equal to that of *Til. Europæa*, and is, perhaps, still more imposing in effect from the massive character of its foliage; this variety, according to Sir J. E. Smith, prevails in the southern parts of Europe.

The red-twigged plants of the nurseries appear to be merely subvarieties of the foregoing kinds, all of which are occasionally found with the young shoots of a bright red colour, and the same may be said of those with twigs of a golden hue. The Cut-leaved Lime-tree, *T. E. laciniata*, with deeply jagged and twisted leaves, is, in our estimation, not worth cultivating, as it is always unsightly and unhealthy in appearance, and rarely attains a height of more than thirty feet.



Tilia Americana. LINN.

AMERICAN LIME-TREE.

Tilia Americana,	LINN. sp. pl. 733.
	LOUD. Arb. Brit. ch. xviii. p. 373.
T. Glabra. vent.,	DON'S Mill. p. 553.
T. Canadensis,	MICHX.

The Smooth-leaved or Black Lime-tree and Bass-wood, Amer.

THOUGH comparatively of recent introduction, we are induced to mention the American Lime-tree as being one

of the finest of the genus, and likely to prove a great acquisition as an ornamental tree. In America it attains a magnitude equal to that of the largest of our European Limes, and there is little doubt but that in England, if judiciously treated, it will reach a size little if at all inferior; several trees though yet quite young, have already attained a height of fifty feet; one is mentioned by Loudon, growing at White Knights, near Reading, as upwards of sixty feet high, the tufting of whose foliage, he observes, has, at a distance, a striking and singular appearance. In America it is found in Canada, and the northern parts of the United States; but in Virginia, Georgia, and the Carolinas, is only met with in the Alleghany mountains. Like its European type, it affects a rich, loose, and deep soil, in which it rises to above eighty feet in height, with a straight uniform trunk frequently upwards of four feet in diameter, and bearing an ample and tufted summit.

The leaves are very large, obliquely heart-shaped at the base, abruptly and acutely pointed at the end, finely toothed, of a deep green and glabrous above, paler beneath.

The flowers appear in America in June and July, but later in England; they are large, the petals with each a scale at the base, pendulous, with a long narrow floral leaf, and odoriferous.

The wood is very white, soft, and easily worked; it is used in America for the panels of carriages, seats of chairs, &c. The inner bark, like that of its congener, *Til. Europæa*, is made into ropes and matting. Several other American Limes, considered by some as distinct species, but by Loudon as varieties of this tree, have been introduced; amongst these, the *T. Amer. heterophylla*, (White Lime of Michaux,) appears to be well deserving

a place in collections; its very large leaves with their white under surfaces often producing a good effect when brought into contrast with the foliage of other trees. It seldom reaches a height of more than thirty or forty feet, and it is doubtful whether it would ripen its shoots in the northern parts of England.





Nat. Ord. Acerácea. LINN. *Syst. Polygamia Monœcia.*

Acer pseudo-platanus. LINN.

THE SYCAMORE, OR GREAT MAPLE.

Acer pseudo-platanus

LINN. sp. pl. 1469.
DON'S Mill. i. 648.
SMITH'S Eng. Flor. ii. 230.
LOUDON'S Arb. Brit. p. 413.

Plane-tree. Scotland.

The specific characters of this species may be stated as follows: leaves palmate, with five acuminated unequally serrated lobes. Racemes pendulous, rather compound, with the rachis and filaments of the stamens hairy; fruit or capsules smooth, with two, sometimes three, large diverging wings.



FREQUENTLY as we hear the Sycamore abused as not worth growing for the value of its timber, and devoid, as an ornamental tree, of beauty of outline and picturesque effect, we nevertheless agree with Sir T. Dick Lauder,* that it is "certainly a noble tree." Vying in point of magnitude, with the oak, the ash, and other trees of the first rank, it presents a grand unbroken mass of foliage, contrasting well, in appropriate situations, and when judiciously grouped, with trees of a lighter and more airy character, and affording, as Gilpin expresses it, "an impenetrable shade." Lauder well observes, "The spring tints of the Sycamore are rich, tender, glowing, and harmonious; in summer its deep green hue accords well with its grand and massive form, and the brown and dingy reds of its autumnal tints harmonise well with the mixed grove to which they give a fine depth of tone." The colour of the bark is also agreeable to the eye, being of a fine ash grey, frequently broken into patches of different hues, by the peeling off, in old trees, of large flakes of the outer bark in the manner of the plane.

The indigenous origin of the Sycamore has been doubted by many British authors, and indeed the earliest records we have, speak of it as a stranger, or tree that had been introduced. Turner, who wrote in 1551, and Gerard, in 1597,

* See the ed. of Gilpin's "Forest Scenery," by Sir T. D. Lauder, v. i. p. 123.

both mention it as such, and Ray speaks of it as a tree common to courtyards, churchyards, avenues, &c., about noblemen's houses; Sir J. E. Smith, also, in the "English Flora," states it to be "not truly wild." To differ from such authorities may seem presumptuous, but the circumstance of its always ripening seed in our ordinary seasons, and the facility with which it bears the most exposed situations, seem favourable to the supposition that in some parts of England it may be an indigenous plant. In Scotland, and the north of England, where it has long been a favourite tree, and where few residences of any note are without specimens of ancient Sycamores, it has, no doubt, been introduced, as it is only in situations where the operations of man are plainly to be traced that it is found of great age and size.

Upon the Continent the Sycamore is spread over the greater part of middle Europe, affecting wooded, mountainous situations. In Switzerland, where it abounds, it reaches, according to Loudon, an altitude as high as three thousand feet above the level of the sea, or to the point where the *vaccinium vitis Idæa* commences. From the strength of its spray, and the nature of its growth, which is stiff and angular, the Sycamore is better calculated than any other tree with which we are acquainted, except it be its congener, the Norway maple, to act as a shelter or break-wind in exposed situations, whether it be upon the coast where it braves the cutting eastern blasts, and even contrives to carry an erect head, thus affording a defence behind which trees of a more delicate constitution may be raised, or upon bleak and elevated tracts, subject to long-continued and powerful winds; for even in such localities, provided the soil be dry, and of tolerable quality, it attains a respectable size, and shows an upright form,

unconquered by the blast. It is for these peculiar and enduring qualities, no doubt, that we see it so frequently, in the north of England and Scotland, planted by itself, or sometimes in company with the ash, around farm-houses and cottages in high and exposed situations. But even as a plantation tree, or where it is to act as a nurse to the oak, we venture to recommend it in preference to some other kinds very generally introduced, such as the wych, or Scotch elm, and the ash, as from the nature of its growth it is much less liable to injure the oaks by whipping or overtopping them, than either of these trees. Besides, a further inducement for admitting it into mixed plantations is, the value of its wood, in the north of England and Scotland, for machinery, and for the ends of herring barrels, for which it is preferred to that of any other by the coopers, and for which purpose it is fit as soon as it has attained a diameter of four or five inches, which it frequently does in favourable soil in the course of twenty years.

The wood is firm, of a close compact grain, susceptible of a high polish, and easily worked; it is not subject to be worm-eaten, or to warp, and works well in the turning-lathe. In England it has generally been applied to minor purposes and in-door articles, such as cheese and cyder presses, tables for common use, mangles, &c.; and when wooden dishes and spoons were in common use, they were mostly made of this wood; it is now, however, extensively used, when of sufficient scantling, for machinery, also in printing and bleaching works, for beetling beams, and in cast-iron foundries for making patterns, for all which purposes it brings a high price, varying from 2*s*. 6*d*. to 4*s*. 6*d*. per foot. Upon the Continent it has always been in great request, and in France and

Germany is very extensively used, for out-of-door as well as in-door purposes. The roots of such trees as have been cut over and afterwards kept as stoves or stocks for coppice wood, are eagerly sought after by the cabinet-makers, being frequently beautifully and curiously veined, and affording a valuable material for inlaying, and other delicate cabinet work. According to M. Hartig, an eminent German dendrologist, the wood of the Sycamore surpasses that of all other trees as a fuel, being unequalled for the quantity of heat it throws out, and the time it continues to burn. The charcoal also made from it is of excellent quality, and surpasses that of the beech in the proportion of 1647 to 1600.

Like most of the maples, the sap of the Sycamore flows freely from an incision made in the tree in the late winter and early spring months; this, upon evaporation by heat, yields a proportion of sugar, varying, as might be expected, in quantity according to the circumstances under which the sap is collected, being affected by the age and vigour of the tree, the temperature of the season, quality of soil, &c. In an experiment mentioned by Sir T. Dick Lauder, one hundred and sixteen parts of sap yielded one part of sugar, very sweet, but with a peculiar flavour. The sap is also sometimes made into a wine in the same way as that drawn from the birch, but it wants the delicate aromatic flavour of the latter. In consequence of the very early and rapid rise of the sap in the Sycamore, no attempt to prune it should be made between the months of January and May, and we would recommend, when the knife does seem necessary, as when a second or double leader interferes with its growth and the symmetry of its form, that it should not be used till after the leaves are fully expanded, as it will then bleed no more, but the elaborated sap will

immediately begin to be deposited and soon form a layer of new wood around the edges of the wound, a great portion of which will be found healed over, or cicatrized before the fall of the leaf.

The soil best adapted for the Sycamore, and in which it attains its greatest size, appears to be a dry rich loam, with a mixture of gravel. It grows, however, in almost any soil not saturated with moisture, and we have seen it attain a tolerable size in a stiffish clay loam, and in what may be called thin and inferior soils. It is of rapid growth, and reaches its usual height in sixty years; the wood, however, continues to improve till it is eighty or one hundred years old, and it frequently continues undecayed for another century.

The leaves are often covered with a clammy matter, or honey-dew, eagerly sought after, and imbibed, by various insects; by some, this matter is supposed to be exuded by the leaves themselves, but we believe, in common with many others, that it is, generally, the product of an insect, and voided by the *Aphides* which infest the tree. It is also subject, when planted in wet and unsuitable soils, to dropsy, or an oozing out of the sap from the trunk, in consequence of a redundancy or an improper assimilation of the juices. The leaves, also, towards the end of summer, become spotted and unsightly by the growth and spreading of a parasitic species of fungus, the *Xyloma acerinum*, Pers., which is beautifully figured, by Dr. Greville, in the "Scottish Cryptogamic Flora," vol. ii. p. 118. Few lepidopterous larvæ feed upon the leaves of the Sycamore, but of those which occasionally do so, is that of *Pygæra bucephala*, the (Buff-tip moth). The flowers are sweetly, but not powerfully scented; they are the resort of various hymenopterous insects, particu-

larly of some of the genus Bombus, viz., *B. hortorum* and *B. Terrestris*; they are produced soon after the expansion of the leaves, and the tree frequently ripens fertile seeds before it is twenty years old.

The Sycamore is propagated entirely by seed, except as regards the blotch-leaved and other varieties which are increased by budding and grafting. The seeds, when ripe, are best sown immediately after being gathered, but if kept till spring, they should be mixed or covered with sand, as when kept dry they soon lose their vegetative power. At the end of the first year the young trees should be transplanted from the seed beds into nursery rows, and as their growth is very rapid, they will be fit to plant out permanently at two or three years old. With due care the Sycamore may be moved when of a considerable age and size; we have succeeded, in several instances, where the tree was about six inches in diameter, and upwards of twenty feet high; such plants, however, possessed, as Sir H. Steward expresses it, all "the protecting qualities" likely to ensure success. It is also an eligible tree to plant in hedge-rows, where protection from the prevailing winds is desired, as it carries an erect stem and wide head, even in the most exposed situations; and we would recommend its insertion as a principal in narrow belts made for the same purpose, taking care to keep them well thinned from an early age, otherwise, a tolerable tree, or one able to resist the blast, can never be expected, as we see too frequently exemplified in those starved-looking belts, where thinning has either been entirely neglected, or only applied after the trees, by their proximity to each other, have been ruined in constitution and drawn up to mere poles, rendering them incapable,

from the want of the protecting qualities, to resist the sudden influx of the air and vicissitudes of the seasons.

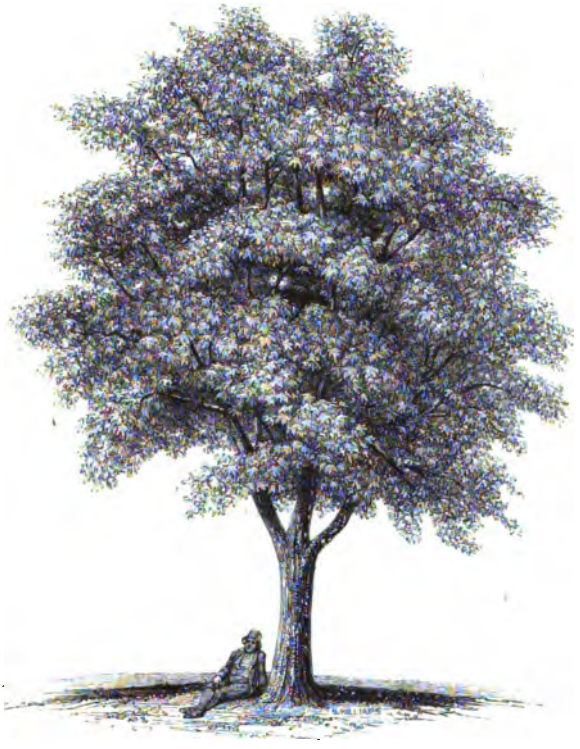


A curious anomaly in regard to the cotyledons of the Sycamore is mentioned by Professor Henslow, in the "Magazine of Natural History," which we have frequently observed since our attention was directed towards the subject. In many young plants he found the cotyledons to amount to as many as four, but in such cases they were all proportionally smaller than in those which bore the normal number (2); in others they were three, two of which were less than the third; and in others, again, one or both cotyledons were merely cloven down the middle, thus showing that the increase of cotyledons did not originate in any extra developement of the organs themselves, but was merely the result of the subdivision of the normal number.

The principal varieties cultivated are, 1st. The Yellow Variegated Sycamore, or *Costorphine Plane* (*Ac. p. flavo-variegata*, Loud.), the original tree grows in the grounds of Sir T. D. Lauder, in the parish of Costorphine, near Edinburgh. To propagate it, budding or grafting is necessary, as the plants raised from its seed are generally green-leaved and without any blotching. 2nd. The White Variegated-leaved Sycamore (*A. p. variegata*, Loud.), much more common than the former: by many these varieties are highly

esteemed; we differ in opinion, and think they generally bear the appearance and aspect of unhealthy trees. 3rd. The Purple-leaved variety, raised in Jersey in 1828; this we have not seen, but hear it spoken of as likely to prove a highly ornamental tree. Other varieties, as the Cut-leaved and Blunt-leaved Sycamores, are to be found in the nurseries, but we deem them scarce worthy of a place in collections.

Our limits will not permit us to give a list of the largest and finest Sycamores in Britain; but as this has already in a great measure been supplied by Sir T. D. Lauder, in his edition of Gilpin, and by Mr. Loudon, in the "Arboretum Britannicum," we the less regret it. We may add to those already recorded, a very noble spreading Sycamore in Mitford Park, near Morpeth, Northumberland, of which our figure is a portrait. This tree has a trunk eleven feet in length before the first great ramifications, measuring, near to the ground, twenty-two feet in circumference, and sixteen feet a little below the branches; it contains three hundred and twenty-seven feet of timber. At Twizell the Sycamore, twenty-five years planted, is thirty-five feet high and twelve inches in diameter.



Acer Platanöides. LINN.

NORWAY MAPLE.

Acer platanöides.

LINN. sp. pl. 1496.
DON'S Mill. i. p. 649.
LOUDON'S Arb. Brit. part III. ch. xxii. p. 408.

AMONGST the great variety of Maples introduced within the last century, the present species is the only one we venture to admit within the limits of our volume, and for

the following reasons: in the first place, it is a tree of the first rank, thrives well in our climate, and attains a height equal to that of the sycamore within a like period of years; secondly, as being a decided acquisition to our park and wood-land scenery; and thirdly, its wood promises to be of more value, and adapted for a greater variety of purposes than that of the sycamore, being white, close-grained, firm, susceptible of a fine polish, and frequently exhibiting those beautiful appearances in the direction and disposition of the fibre, for which the Bird's-eye Maple of America is so highly prized and sought after. It is a native of Europe, and, as the name implies, is found as far north and west as Norway; it is also met with in France, Switzerland, and Germany, and eastward in Russia. Loudon* observed it in 1814 "in all woods bordering the public road from Wilna to Mittau, and from Moscow to Gallicia;" he further adds, "next to the birch and trembling poplar, it seemed to us the most abundant tree in the Russian woods."

The sap of this species, like that of most of its congeners, contains a considerable portion of saccharine matter, and sugar is sometimes made from it; in Norway and Sweden it flows in less abundance than that of the sycamore, but contains more of the saccharine principle in a given quantity of sap than the latter tree. Upon a rich free soil it grows with rapidity and luxuriance, and even thrives upon soils of an inferior quality, provided they are not surcharged with moisture. Another recommendation it possesses is its aptitude to withstand the effects of the sea-breeze, which it is found to do upon the western coast of Scotland as well as upon the shores of the Baltic and western coast of Norway.

* "Arboretum Britannicum," p. 410.

The foliage, though not so heavy and massive as that of the sycamore, is umbrageous; the leaves, which in shape bear a striking resemblance to those of the *Platanus occidentalis*, are large, with long slender petioles, and when fully expanded, of a fine shining lightish green; in an early or half-expanded state they are of a delicate yellowish green, and in autumn, before they fall, become of a rich warm yellow.

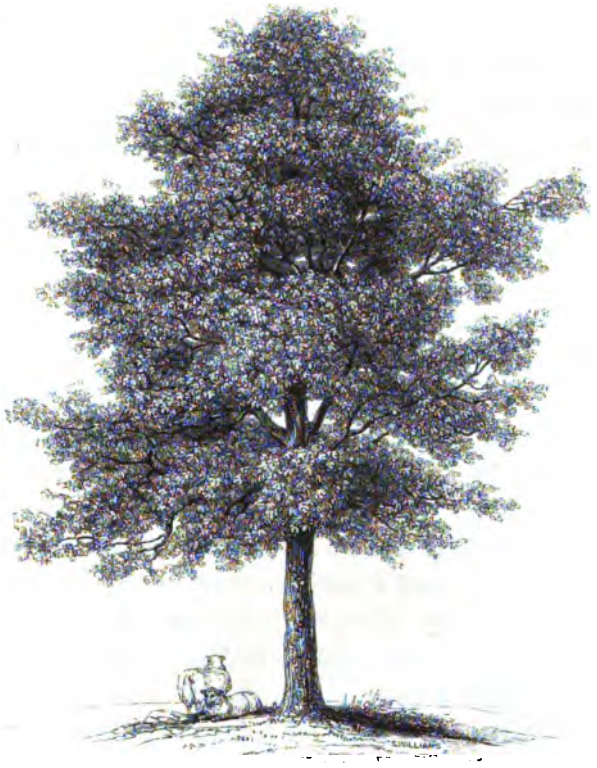
The flowers, which are yellowish green, appear upon the first bursting of the buds, and before the leaves are half expanded they are sweetly-scented, and eagerly sought after by the bees, to which they afford an early, and, at that season, a valuable pasture. The buds are full and large, and during winter of a deep red colour, and the bark of the young shoots, which at first is green, afterwards becomes of a brown tint, with numerous white specks; that of the trunk is greyish brown. It is propagated by seeds, which are abundantly produced and found fertile upon trees after they have reached the age of eighteen or twenty years; these are to be treated in the same manner as those of the sycamore, and the management and nursing of the young plants is similar.

We may here mention another Maple highly spoken of and likely to be a first-rate acquisition, both as an ornamental and a timber tree; this is the *Acer macrophyllum* of Pursh, seeds of which were first sent to this country by Mr. Douglas in 1812. It is a native of the N. W. coast of America, between lat. 40 and 50 N. Douglas speaks of it in the following terms: "It is one of the most graceful trees in the country it inhabits, varying from forty feet to ninety feet in height, and from six feet to sixteen feet in the circumference of its trunk; the branches are widely spreading, the bark rough and brown, the wood

soft but beautifully veined. The flowers are yellow and very fragrant, appearing in April and May." He further adds, "It will, at some future time, constitute one of our most ornamental forest-trees in England."* Hitherto it has been propagated by layers, but as it is perfectly hardy, there is little or no doubt of its ripening seed when the trees have attained a sufficient age.

* Hooker's "Flo. Bor. Amer." i. p. 112.





Acer campestre. LINN.

THE COMMON, OR FIELD MAPLE.

Acer campestre.	LINN. sp. pl. 1497.
	SMITH'S Eng. Flor. ii. p. 231.
	DON'S Mill. i. p. 649.
Acer camp. hebecarpum.	LOUDON'S Arb. Brit. p. III. ch. xxii. p. 428.

NOTWITHSTANDING the remark of Gilpin that the Maple is an uncommon tree, though a common bush, and that several writers on Arboriculture have passed it with a

very transient notice, or only mentioned it as a tree of very inferior rank and quality, we should not feel justified in omitting it altogether in the present volume, both as being one of a not very numerous list of indigenous British trees, and for the appearance we have seen it assume, and the dimensions it has acquired when planted in a favourable soil and situation, and treated as a tree. Under such favourable circumstances we have frequently seen it attain a size nearly approaching that of a tree of the first rank, with a handsome outline and picturesque appearance; such examples are now growing upon the banks of the Wansbeck, near Morpeth, and other places in Northumberland, and these corroborate the opinion the author of "Forest Scenery" was inclined to form of the picturesque appearance of the Maple, in the few instances he met with it in a state of maturity.

In the south of England it is very rarely planted or treated as a tree, and therefore seldom to be seen in that form; for, growing principally in hedges and copse-woods, it is regularly cut over and treated as a bush, like other shrubs of inferior growth, such as the hazel, black-thorn, &c. Though indigenous in the south and midland counties it does not extend to the most northern or to Scotland, neither has it been found in Ireland. Upon the Continent its distribution seems extensive, comprehending all the middle states of Europe, and it is also mentioned as a native of Northern Asia.

The wood of this species when allowed to become a tree, and of a proper age, is very compact, possesses a fine grain, sometimes beautifully veined, and susceptible of a high polish, and there can be little doubt, if cultivated and brought to market in quantity, would soon be extensively used in turnery and other work requiring wood

of this texture and quality. That in ancient times it was held in high estimation we gather from Ovid, who describes it as

——————— acerque coloribus impar.

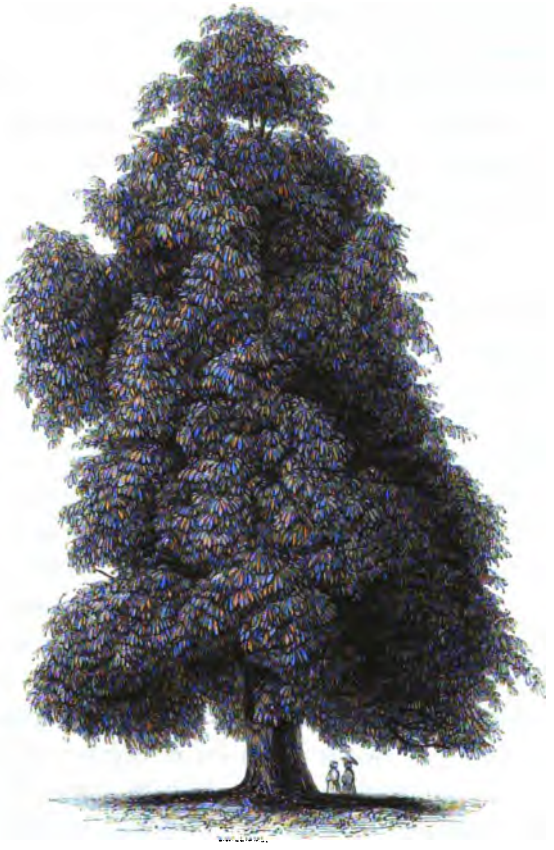
And again from Pliny, who has treated at length upon the *brusca* and *mollusca*, the names under which the knobs and excrescences of this tree were recognized, and of which furniture and cabinet work of the most costly description were fabricated. In France, and other continental parts, it is still extensively used by turners and cabinet-makers, and the wood of the roots, which is often knotted and curiously marbled, is converted into snuff-boxes, pipes, and other fancy articles.

When green, the wood weighs sixty-one pounds nine ounces the cubic foot, and loses about ten pounds in seasoning; it burns freely, and is considered an excellent fuel; the charcoal made of it is of the very best quality, and fit for the manufacture of gunpowder. When topiary works were in fashion, it was one of the plants used in this kind of gardening, as it was found to bear the shears as well as the hornbeam or beech; but since they fell into disuse, it is scarcely inquired for at the nurseries, though we think it well deserves a place, as a picturesque tree, in ornamental grounds, and might also be advantageously introduced as an under-growth into many of our mixed plantations. It is propagated by seed, which is produced in profusion by old trees; only a portion of what is sown comes up the first year, the remainder lying eighteen months in the ground before it vegetates; the young plants, after being run into nursery rows, are fit to put out permanently in the course of three years. A blotch-leaved variety and another of a free fastigiate growth, are to be met with in the nurseries, both of which are pro-

pagated by layers. Few insects or their larvæ seem to feed upon the leaves of the Common Maple, with the exception of a small dark green aphis, which is sometimes very abundant soon after the expansion of the leaves. Loudon observes, that the misletoe is sometimes found growing upon this species.

The specific characters of the *A. campestre*, according to botanical authors, are, leaves cordate, with five lobes, toothed; racemes corymbose, erect, the wings of the fruit much divaricated.





Nat. Ord. Æsculaceæ. LINN. *Syst. Heptandria Monogynia.*

Æsculus hippocastanum. LINN.

HORSE-CHESNUT.

Æsculus hippocastanum. LINN. sp. pl. 488. LOUDON's Arb. Brit. ii. p. 463. DON's Mill. i. 652.

IT is the generally received opinion that the Horse-Chesnut tree is a native of the mountainous parts of

Asia,* and that its introduction into Europe took place about the middle of the sixteenth century: Clusius informs us that at Vienna, in 1558, there was a plant of this species that had been brought there twelve years before, and our countryman Gerard, in 1579, the first of our writers who mentions it, speaks of it in his Herbal as a rare foreign tree; and as his description is minute and particular in regard to its growth, foliage, &c., we may thence suppose that a specimen, or specimens of it had at that time attained a considerable size, and even flowered in England, a supposition which would accord with the statement of M. Bom St. Hilaire, that the Horse-chesnut was brought from the mountains of Thibet to England, in 1550, and from thence to Vienna in 1558.† In France it was not known before 1615, when it was first raised from nuts procured from the Levant. We afterwards find it mentioned in Johnson's edition of Gerard, 1633, as then growing in Mr. Tradescant's garden at South Lambeth; from this period till the time of Miller it appears to have attracted great attention, and acquired a high reputation as an ornamental tree, as he states it in 1731 to be very common in England, and extensively used in the formation of avenues and public walks. In Scotland it appears to have been introduced between 1630 and 1640, if the age of the two trees growing at Dawick, the seat of Sir John Murray Nasmyth, mentioned by Sir T. D. Lauder, and considered to be the oldest in Scotland, is correct. It is still very generally, though not numerously introduced as an ornamental tree in parks, and near the mansions of our gentry, and often with excellent and splendid effect; for in addition to its

* Mr. Royle, however, in his illustrations, says he never met with the common Horse-chesnut in the mountainous parts of Northern India, though there the *Pavia* or Indian Chesnut is abundant.

† "Mémoire sur les Marrons D'Inde."

floral beauty, which exceeds that of any other tree of equal size, its massive and luxuriant foliage contrasts well with that of trees of a more airy form and character, thus producing that breadth of light and shade which gives such value to landscape scenery. Gilpin, we are aware, has called it a heavy and disagreeable tree, and such it often may be deemed, considered individually, and merely in regard to picturesque beauty, though we have seen Horse-chesnuts when old, assume, even as individual trees, a picturesque form and appearance; in a young state we allow that it is a stiff and formal plant, without those breaks in the foliage and outline which are necessary to produce picturesque effect, but when fully grown, and with the dimensions it attains in a suitable soil and situation, it is, if not a picturesque, at least a gorgeous and magnificent vegetable production, especially when clothed, as Sir T. D. Lauder so well describes it, "in all the richness of its heavy velvet drapery embroidered over with millions of silver flowers." As the wood of the Horse-chesnut is of an inferior quality, and only used for purposes of minor importance, it is rarely planted in mixed plantations, or where profit is the object; and even were its wood of more general application we would not recommend it as a secondary or nurse, where another kind of timber was intended to form the ultimate crop, as it soon interferes with the growth of its neighbours, and occupies too much room for such a purpose.

The wood is white and very soft, and, according to Loudon, loses much of its weight in drying, as when first cut it weighs from sixty to sixty-two pounds per cubic foot, and is reduced by drying to thirty-five or thirty-seven pounds. It answers for packing-cases, boarding, and other interior work, but is unfit for any purpose where it is to be exposed to the open air, or subject to be alter-

nately wet and dry; it is also used in turnery, for boxes, and several other minor articles, where a soft and easily wrought wood is required. The bark, which is very bitter, has sometimes been substituted for Jesuits' Bark; it also gives a yellow dye, and is sometimes used in tanning. The nuts, when bruised or reduced to a pulp, possess a detergent quality and act as soap, and in Ireland they are sometimes used for bleaching linen. In Turkey the nuts are ground and mixed with other horse-food, being esteemed of service to horses broken or touched in the wind.

To attain its greatest dimensions the Horse-chesnut requires a deep fine loam in a situation rather protected from winds, as it is liable when young, and where much exposed, to be seriously injured by having the side-branches torn from the stem. It is perfectly hardy and remains uninjured by our severest winters; and indeed the nature of the buds, and the manner in which they are protected by their numerous envelopes and exterior covering of resinous varnish, evidently shows that the species is a native of a country where the winter cold must be very severe. It is propagated by the nuts, which are best sown immediately after being gathered, as they soon lose their vegetative power if allowed to become dry. Loudon recommends planting the nut where the tree is intended to remain, as he says it is likely to attain the largest size in the shortest time, in consequence of thus having the tap root untouched and uninjured. This, we admit, is likely to be the case for a certain number of years, but it may be doubted whether a transplanted tree will not ultimately attain as large a size as one reared in the manner recommended. It is a tree of the largest size, attaining, in a favourable situation, a height sometimes as great as ninety

or one hundred feet, with a trunk of proportionate thickness. In Loudon's "Arboretum Britannicum," where the dimensions of most of the finest trees growing in England, Scotland, and Ireland, are recorded, we find several with trunks measuring five, six, and nine feet respectively, in diameter, and with heads, some of them covering an area of one hundred feet in diameter. It grows with an erect and pyramidal head; the leaves are large and composed of seven leafits, their colour a deep rich green; when first developed, or as they burst from the bud, they are small and beautifully folded longitudinally, and covered with a down or pubescence, which falls off as they expand.

The growth of the leaves and annual shoot is very rapid, both being frequently perfected in three or four weeks from the first bursting of the bud, although the shoot is very strong, and often measures eighteen or twenty inches in length; the flowers, whose racemes terminate the shoots, begin to expand as soon as the leaves are perfected; they are white, variegated with red and yellow, and have not inaptly been compared to those of a gigantic hyacinth. The spray of the Horse-chesnut is clumsy and stiff in its appearance, which arises from the angular mode of its growth and the thickness of the shoots; it however becomes less so as it advances in



age, when the great length and weight of the lateral branches oblige them to take a drooping direction.

A variety with a double flower, and another with variegated leaves, are to be procured at the nurseries, but the latter is a ragged unhealthy-looking tree, and not worth cultivating. Among the other species of Æsculus introduced, the Red or Scarlet flowering Horse-chesnut, *Æs. rubicunda*, is the most ornamental. Loudon remarks that it is doubtful whether this tree be a native of North America or originated in a British garden.

At Twizell the Horse-chesnut, eighteen years planted, measures at two feet from the ground, four feet two inches in circumference, height about thirty eight feet.





Genus *Ilex*. LINN. *Syst. Tetrandria Tetragynia.*

Ilex aquifolium. LINN.

COMMON HOLLY.

Ilex aquifolium.
LINN. sp. pl. 181.
SMITH's Eng. Bot. v. 7. t. 496. 2nd. Eng. Flor. i. p. 226.
HOOKER's Flo. Sco. 57.
LOUDON's Arb. Brit. p. III. ch. XXXIV. p. 565.

THE size which the Holly frequently attains in a state of nature as well as when under cultivation, its beauty and importance in forest and woodland scenery, either as a

secondary tree or merely as an underwood shrub, added to its being of indigenous growth, are circumstances of sufficient importance to justify our admitting it into a work like the present, and to place it among the British forest-trees of the second rank. There are many, we believe, who are scarcely aware of the size to which a Holly will grow under favourable circumstances, and who only judge of the plant as they have seen it in shrubberies, hedges, or as an underwood overtopped and shaded by the giants of the forest; such will be surprised to learn that there are many examples of Hollies in England and Scotland, that have attained a height of forty, forty-five, and even fifty feet, with trunks varying from two to four feet in diameter.* Such instances, we admit, are not very common, and only met with in woods where the Holly is indigenous, and has not been cramped in its growth by other trees, or where it has been planted and afterwards treated as a tree, and not as an underwood evergreen.

The climate of England and Scotland appears to be particularly favourable to the growth of the Holly, for, although it occupies a pretty extensive geographical distribution throughout the middle and southern parts of Europe, in no part does it attain so large a size as it does with us. Its indigenous origin is satisfactorily proved by its prevalence in the remains of all our natural woods and aboriginal forests; thus, in England it abounds in that of Needwood, in Staffordshire, the New Forest in Hampshire, and many others. In Scotland few natural woods are unenlivened by its presence, and though its usual form is that of an underwood to oak, ash, and other trees of a quicker and more exalted growth, it frequently assumes the form

* We refer our readers to the dimensions of various Holly-trees recorded in Loudon's "Arboretum Britannicum."

and reaches the dimensions of a tree of the second rank. Such are many of the trees mentioned by Sir T. D. Lauder as growing in the forest of Tarnawa, upon the banks of the Findhorn, in Aberdeenshire, and those mentioned by Sang, which grew in the forest of Blackhall, upon the river Dee, in the same county. In Northumberland we know several remains of natural woods where the Hollies are numerous, and where many have attained a size equal to those upon record. At Detchant, near Belford, in a large natural wood, there are still Hollies of a very large size, though most of the finest have been cut down within the last few years, and their valuable timber sold to the herring curers. At Twizell House there are also several Hollies of ancient growth and considerable size in the wooded dells and other remains of natural wood.

As an ornamental evergreen, whether in the form of a tree, or as an undergrowth, the Holly is one of the most beautiful we possess; its deep green glittering foliage contrasts admirably with the rich coral hue of its berries, and in our opinion it is from the contrast being more decided, that the Common, or Green Holly, has, in this respect, an advantage over any of the variegated varieties, however elegant they may be; for although we confess that we entertain a general dislike to variegated or blotch-leaved trees, we are inclined to make an exception in favour of some varieties of the Holly, particularly those with silver and gold-striped leaves, as they exhibit none of that ragged or sickly appearance which has always struck us as belonging to the blotch-leaved varieties of other trees.

In natural woods, and especially in the deep glens and rocky denes of our northern districts, however beautiful and diversified the scenery may be, it never fails to receive

an additional life and charm wherever the Holly is present to intermingle its glossy foliage with the various tints around it. Oft have we stood and lingered in our walks to watch and admire the bright and fleeting lights produced by our favourite evergreen, as moved by the gentle zephyr, its polished leaves have reflected in diamond-like coruscations, the rays of light as they penetrated the recesses in which it grew, at the same time that its rich dark green foliage by force of contrast, gave an additional value to the paler tints of the mountain ash, the hazel, and various other shrubs which grew around it.

Another important application of the Holly, and for which it is peculiarly adapted from its great durability, its patience under the shears, and its impenetrable surface when kept in proper order, is the formation of living fences or hedges; for this purpose, and when the hedge is meant to be permanent, the qualities we have just mentioned render the Holly superior to any other plant we possess; besides, holly hedges may be trained to a greater height than any other kind, and with sufficient strength to bear and resist the heaviest winds; at all seasons, too, they present a cheerful and lively appearance, and as the plant is attacked by few insects, the leaves are rarely eaten or disfigured, its only enemy being a very small caterpillar which feeds upon the parenchyma of the leaf, and whose tortuous course beneath the cuticle is only visible on close inspection.

The usual, and indeed the only objection to the Holly as a hedge plant, is the slowness of its growth; this objection, however, we think will only be found to hold good where the necessary attention to the due preparation of the soil, and the removal and after-culture of the plants have been neglected. We have known and seen

holly hedges which, under proper treatment, became fences in as short a time as one of hawthorn, privet, or almost any other sort of hedge plant would have done. In all such cases, however, great care was taken in the removal of the plants, and the previous preparation of the soil; and when the annual growth of the Holly is considered, (the leading shoots, under favourable circumstances seldom falling short of eight or ten inches,) it may easily be supposed that a few years would suffice to make a good fence, where every care had been taken in the selection and proper insertion of the plants.

Under the old system of gardening, and disposition of pleasure grounds, the Holly was much more extensively used as a hedge plant than it is at the present day. Evelyn, in his Sylva, speaks with honest pride and rapture of his impregnable hedge at Say's Court, four hundred feet in length, nine feet high, and five feet in diameter, "the taller standards at orderly distances blushing with their natural coral: it mocks (he adds) the rudest assaults of the weather, beasts, or hedge-breakers."

——— et illum nemo impune lacessit.

In Scotland, the most celebrated holly hedges are those at Tynyngham, the seat of the Earl of Haddington; those at Collington House; and those at Morton, near Edinburgh. At the place first named there are two thousand nine hundred and fifty-two yards of holly hedges, most of them planted about one hundred and twenty-seven years ago. In height they vary from ten to twenty-five feet, and are from nine to thirteen feet in width at the base. They are regularly clipped every April, and are protected from cattle and other injury, by a ditch on either side.

The Holly grows in almost any soil, but thrives best, and attains its greatest size in a rich sandy or gravelly loam; we have also seen it very large in what may be called a stiff loamy clay, not overcharged with moisture: Miller says it thrives in a gravelly soil over a substratum of chalk, and in Buckinghamshire, Kent, and some other counties, the finest Hollies are growing in soil of this description.

Boucher remarks that it refuses not the poorest, hot, sandy, gravelly, and rocky ground, nor the coldest spouty clay and till. By Loudon, bogs and marshes are excepted as habitats, but we have frequently met with it in what may be called very spongy, if not actually boggy ground. In most of our woods where the Holly is indigenous, it is more frequently met with as an under-growth than as a timber tree, having been overtopped and kept down by the quicker and more rapid growth of its neighbours; it is, however, this quality, of bearing with comparative impunity the drip and shade of other trees, that renders it unequalled as an underwood evergreen, and allows it to grow in a situation where the box-tree and common laurel can barely exist.

The site most favourable for the full developement of the Holly, is where the other trees do not grow so close together as to overtop it; such has been the case with the fine specimens in Needwood, the New Forest, and other natural woods; and there can be little doubt, from the experiments already made, that the Holly may be reared as a tree in our plantations, provided due care be taken to keep its head free and trained to a single stem.

However difficult and uncertain in Evelyn's time the manner of obtaining young Holly and other trees might

be,* the usual practice of the present day is to raise the species from seed, the varieties being propagated by budding, grafting, and sometimes by cuttings. Like the seeds of the hawthorn, those of the Holly do not vegetate the first year, the berries are therefore mixed with sand or earth, and turned frequently over to facilitate the decay of the skins and pulp; this is generally effected in the course of eight or ten months, or by the autumn following that in which they were gathered; they are then, by sifting, cleansed from the earth with which they were mixed, and sown in beds of finely pulverized soil, and covered to the depth of nearly half an inch. Some attempts to forward the germination of the Holly, and other long dormant lying seeds, have been made by steeping and fermenting the berries in hot moist bran, but this process is not likely to obtain, being found uncertain from the difficulty of regulating the temperature so as to destroy and decompose the pulp without injuring the vitality of the seed.

In a year and a half, or two years, the young plants should be taken from the seed bed and run into nursery rows, the seedlings placed six or eight inches apart from each other, and the rows at eighteen inches or two feet distance; and so long as they remain in the nursery, they ought to be removed at least every second year, in order to ensure success on their final removal to their permanent stations.

At Twizell, where many thousands of Hollies have been planted in the grounds and plantations with unvarying success, the following mode of treatment previous to their final removal from the nursery was adopted:— the seed-

* It appears from Evelyn that few nurseries existed in his time, and that the seedlings of the Holly and other forest-trees were mostly collected in the woods.

ling plants when raised at home, were taken from the seed beds, when about two years old, and run in rows in the nursery, the soil of which was a stiffish loam; the plants were placed about eight inches distant from each other in the rows, and the rows themselves two feet apart. After standing two years, they were moved to another break of the nursery where the soil was of a similar or rather stiffer quality, care being taken at the same time to remove them with as much earth as possible attached to the roots; at this, their second transplanting, they were placed at eighteen or twenty inches distance from each other, and the rows about three feet apart. After standing there two years, the greater part were found fit for putting permanently out; and, from the nature of the soil in which they had been reared, and the distance at which they stood from each other, there was no difficulty in removing them with their roots uninjured, and protected by a large ball of clayey loam.

Such as were thought unfit for planting out, or were intended to be reserved for particular purposes, were again transplanted into the stiff soil, taking care to increase the distances between the individual plants and rows much after the plan recommended by Boucher. After long and extensive experience, having transplanted many thousand evergreens of different kinds, we are persuaded that the safest and best season for doing so is during the winter and early spring months. It is acknowledged to be so in regard to deciduous trees, and ought to hold equally good with evergreens, as they also are subject to a certain degree of torpidity during this period, or before they begin to grow and push forth their new shoots; their torpidity, we allow, may not be so complete at any time as that of

deciduous trees, but sufficient to prevent their roots, leaves, &c., from feeling the effects of removal to the same extent that they must necessarily do when in a state of actual growth or excitement. We have, it is true, succeeded in transplanting evergreens, and Hollies among the number, at a later period, viz., May and beginning of June, but in such cases great care was taken to prevent the effect of evaporation, by constantly keeping the earth around the roots in a very moist state; this must also be attended to in transplanting evergreens in the early autumn months, unless the season itself be very wet.

The wood of the Holly is valuable in turnery, joinery, and cabinet-work, being white, very hard, with a fine homogeneous grain, and susceptible of a fine polish. It is stained of various colours with great facility, on which account it is highly prized for veneering and inlaying. Mathematical and engineering instruments are also made of it, and it has sometimes been substituted for the box in wood-engraving. When dyed black it frequently supplies the place of ebony in the handles of silver and metal tea-pots, coffee-pots, &c. According to Loudon, when dry, the cubic foot weighs forty-seven pounds seven ounces.

Of the bark birdlime is made, but the manufacture of this article is now greatly curtailed, and the Hollies, fortunately, escape that barbarous stripping system, which used to destroy many of the finest trees, and disfigure many more. Should, however, any of our readers wish to know the process of making it, they will find it fully detailed in Evelyn's "Sylva," or in Loudon's "Arboretum Britannicum."

The custom of ornamenting our churches and dwelling-

houses at Christmas, with sprigs of Holly, is well known to our readers, and appears to be of very ancient date: Dr. Chandler supposes it may have been derived from the Druids, who are said to have decorated their dwellings, during winter, with evergreens, "that the sylvan spirits might repair to them, and remain unnipped with frost and cold winds, until a milder season had renewed the foliage of their darling abodes;" but it is more likely to have been first adopted by the early Christians, at Rome, where the Holly had long been used, as an emblem of good wishes, in the great festival of the Saturnalia, celebrated about that period of the year.

The varieties and subvarieties of the Holly are very numerous, but the two most deserving of propagation are, unquestionably, the White-edged leaved Holly (*I. aquialbo marginatum*), and the Gold-edged leaved Holly (*I. aquiaureo marginatum*); these two are, at all times, highly ornamental, and, contrary to what is observed in most other variegated trees, have no sickly or unhealthy aspect, but grow as freely, if not more so, as the common species. They are propagated by budding and grafting upon the common stock at the usual time for these operations; sometimes cuttings are used, but these, independent of their not striking freely, rarely make such good plants, and, besides, are much longer before they are large enough to plant permanently out.

In severe winters we have found the hares and rabbits very injurious to the Hollies, and in the long-continued storm of January and February, 1838, many plants of as large a diameter as three or four inches, were killed to the surface of the ground by having their bark stripped off as high as the animals could reach. We are now

obliged, when planting Hollies in the woods, to surround each with a wicker fence to protect them for a few years, or until they have acquired strength and size sufficient to resist the nibbling propensities of our four-footed game; or else, previous to planting, to dip them overhead in a thickish mixture of soot, cow-dung, and water, which protects them for at least a couple of seasons, and does not injure the growth of the plants.





Nat. ord. Leguminaceæ.

Robinia, LINN. — LINN. *Syst. Diadelphia Decandria.*

Robinia Pseud-Acacia.

ROBINIA, OR FALSE ACACIA.

Rob. pseud-acacia.

LINN. sp. pl. 1043.
DEC. prod. ii. p 261.
DON'S Mill. ii. p. 237.
LOUDON'S Arb. Brit. part III. ch. xli. p. 609.

THE extraordinary sensation created in regard to this tree about sixteen years ago by the late Mr. Cobbett, who,

under the new or little known Anglo-American title of Locust tree, gave it a notoriety that led to its being planted on an extensive scale throughout a great part of England, and even as far north as Scotland, would of itself seem to require notice in a work like the present without adverting to the additional claim it has of being one of the first North American trees introduced from thence into England, where it has been cultivated for its ornamental appearance for more than two hundred years. During this long period, its qualities as a useful timber-tree in the extensive application of the term, have, as may be supposed, been frequently tested, and become the subject of discussion. This has been the case particularly in France, where, at a very early period it had been received, with especial favour, as an ornamental tree, and afterwards, on account of its supposed merits, planted upon an extensive scale; repeated trials, however, had proved that its merits, as a generally useful timber, had been very greatly exaggerated, and at the time Mr. Cobbett again brought it into notice, it had, in England, ceased to be much regarded excepting as a tree worth cultivating on a limited scale, for the beauty of its flowers and foliage, but not calculated to repay the expense of extensive cultivation by its produce in timber. It therefore does appear extraordinary, with the previous knowledge we had of this tree, that Mr. Cobbett should, by his writings alone, have had such influence as to have set at nought all prior experience, more particularly when we recollect that his laudatory recommendations were not founded upon any trials or personal experience of its cultivation and growth in England, but were derived from such observations as he had made upon it during his residence in North America, where, we learn, from authentic sources,

that although used on account of its durability for many minor purposes, or where timber of a small size only is required, it seldom attains sufficient scantling to make it generally useful.

We can only suppose that the majority of his readers and admirers were deceived by the name under which it was thus introduced, and actually believed it to be a new tree, and this appears to have been the fact from what Loudon states in the "Arboretum Britannicum," he tells us that though quantities of plants of the *Rob. pseud-acacia* stood unasked for in the nurseries around London and other places, the *Locust*, which every one imagined could only be had genuine from Mr. Cobbett, was in such demand that he could not grow plants in sufficient quantity or fast enough to supply it, that he then had recourse to those very nurseries, and purchased their plants to a great extent in order to supply his customers until more could be raised from the tons of seed he imported from America.

The very rapid growth of the Locust, for a few years after planting, tended to keep up the delusion, and those who were not aware of the habit of the tree, felt confident, from witnessing this rapid progress, that whatever Cobbett had written or predicted respecting it was correct, and about to be verified; this circumstance, we need scarcely add, favoured Mr. Cobbett's views as a nurseryman, and enabled him, for several years, to reap a rich harvest by the sale of his plants. Sixteen or seventeen years have now elapsed since the Locust mania first prevailed, and it may be much doubted whether the expectations of those who planted it with a view to profit, are now as sanguine as they were some six or eight years ago. The

comparative neglect, indeed, into which it has fallen, and the cessation of the demand for plants within the last few years, are strong presumptive proofs that these expectations are at an end, and that its former admirers and advocates are convinced that its merits as a timber tree have been greatly exaggerated.

Upon a careful review of what has been written upon the Robinia, it appears to us that the testimony of its greatest admirers, and of those who have so strenuously advocated its cultivation, goes only to prove the enduring quality of the wood, and its consequent fitness for various purposes, but all of minor importance. No evidence is adduced to show that in this climate, even with the advantage of the best soil, it is likely to attain a size sufficient to make it of use where timber of a certain scantling is required. Cobbett, indeed, has been lavish in his praises and in his predictions of its general utility, but few, we think, will be inclined to place implicit confidence in these, when the powerful motive (self-interest) which induced him to wield his pen in favour of the Locust is taken into account. From our own observations on this tree, we are decidedly of opinion that it cannot be grown to profit, or at least to equal profit, with many other trees, even for those minor uses for which it is stated to be so well adapted, such as posts, railings, hop-poles, &c., much less as a timber-tree applicable to general purposes. The durability of the wood of the Locust we do not deny or dispute, indeed our own experience has proved that when mature, it possesses the quality of resisting decay in the most trying situations to an eminent degree; what we contend for, is, that this solitary advantage of durability—(an advantage we believe possessed in nearly an

equal degree by the larch, and perhaps by the wild cherry,) is not sufficient to counterbalance the disadvantages under which it labours.

Among the various objections to which the cultivation of the Locust upon an extensive scale and with a view to profit is liable, the following appear to hold a prominent place: 1st. it requires a rich free soil and sheltered situation to attain a size fit for any useful purpose, and even with these advantages, it seldom attains dimensions to make it generally useful: 2nd. from the succulent and exhausting nature of its roots, it requires a much greater space to reach maturity than many other trees producing timber of a larger scantling and of greater value: 3rd. it is not a tree to plant in mixed plantations; the surrounding species, notwithstanding the rapidity of its early growth, generally overtopping and destroying it before it acquires size sufficient to repay the planter for its occupancy: 4th. trees equally or, in some respects, better qualified for the uses for which the Locust has been recommended, can be grown upon inferior soils, in less time and in much greater bulk, both individually and per acre: such we hold to be the case with the larch, where posts, railings, hurdles, and other enduring articles are required; and such is the case with the ash, the Spanish chesnut, and the gean, where hop-poles are the object in view. Indeed, with respect to the fitness of the Locust for the latter purpose (for which it was highly lauded by Cobbett), the evidence adduced by Mr. Loudon is pretty conclusive against it; as he shows, that at a hop-pole size, it does not last longer than other woods, that the stools do not throw up shoots so freely as those of many other trees, and that the essential requisites of a

hop-pole — viz. length and straightness — cannot be procured from the Locust even in the most favourable situations, or when drawn up in nursery rows. The growth of the tree precludes the possibility of a perfectly straight pole; for as it never ripens the whole length of its young and rampant shoots, the following year's growth being from a side-bud is necessarily at an angle with that of the preceding year.

One of the most important uses to which the Locust has been applied, is that of forming *trenails*, or ship fastenings; for this the durability and fibre of the wood render it even superior to that of the best oak, a fact established by repeated trial and experiment. These are now exported from America to a great extent, and as long as that market remains open to us, it would not repay the grower to cultivate the Locust for this special purpose in England.

The light and elegant foliage of the Acacia, its sweetly perfumed flowers, and frequently picturesque pendant form when arrived at maturity, will always ensure it a place in our pleasure grounds, parks, and lawns. It requires, however, a sheltered situation in this climate; for, as Gilpin observes, "it is of all trees the least able to endure the blast," its branches being broken in all directions, and torn asunder at their junctions by every gust of wind. To this we may add the further disadvantage of coming late into leaf, and being among the very first to cast its foliage in autumn, and this without undergoing any change of colour, or exhibiting those beautiful and mellow tints which enrich the landscape at this season of the year.

The Locust, to attain any size, requires a rich free loam, much room, and an airy, but, at the same time, a sheltered situation: it grows rapidly for the first few years, its roots

being large, succulent, and well calculated to abstract nourishment from the surface, near which they run. It is this power of abstraction and rapid early growth that has deceived many, and given reason to suppose that the Locust would continue to thrive upon a poor soil; for, seeing the progress it makes for two or three years in soil of an inferior quality, and as long as the surface remains unexhausted, planters look for a continuation of this rampant growth, an expectation, indeed, we ourselves entertained some years ago, before we understood the nature and habit of the tree.

After the first ten or twelve years, when the Locust upon good land will probably have attained a height of twenty feet, and a diameter of three or four inches, its growth becomes very slow; and few trees at the end of fifty or sixty years will be found with a trunk of more than a foot in diameter.

In cold wet clays, or poor tilly soils, it very soon becomes stunted and unhealthy, rots at the heart, and never attains size sufficient for any useful purpose. It is generally raised from seed, and the best is procured from America, though that ripened in England or France vegetates freely and is frequently used.

With us, the seed ripens in October, and is perhaps best sown immediately after being gathered; but it will keep in the pod till spring, or even for several years if buried deep in dry earth. It comes up the summer following the autumn or spring in which it is sown, and the plants by the end of autumn are generally fit for transplanting into nursery rows, or to the situations where they are to remain; for many of them, if the soil be rich, will in that short time have attained a height of three or four feet.

It may also be propagated by suckers, which are thrown up in abundance, by cuttings of the roots or branches, and by large truncheons, but these different modes are not often resorted to when seed can be procured.

In Britain, it is very free from the attacks of insects, both as regards the foliage and wood; but the bark and shoots of young plants are so much to the taste of hares and rabbits, that where they abound it is very difficult to rear the tree without some artificial protection; and to do this, when it is intended to plant it upon an extensive scale, becomes a very serious inconvenience.

In North America, the native country of the species, it is extensively distributed, being found in most of the United States, and in the Canadas: it does not, however, appear to have any great power of occupancy, as Michaux remarks that it forms a much smaller part of the forests than several other kinds of trees, and that it is nowhere found occupying exclusively tracts even of a few acres. It seems to attain its greatest magnitude in the rich lands of Kentucky, where specimens sometimes attain the height of seventy or eighty feet, with a trunk of four feet in diameter. Such gigantic individuals are, however, rare, and its usual dimensions in other districts seldom reach one half of the above.

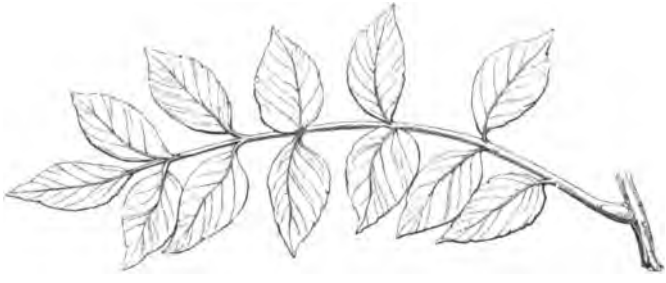
Loudon observes, that even in its native country, it seldom if ever is found with a clean straight trunk that will admit of being sawn up into boards of even moderate dimensions. In America, the principal consumption of the Locust is for posts, which, if seasoned before they are driven into the ground, are estimated to last forty years; but, as Michaux observes, the durability is wonderfully affected by the soil and situation in which the trees have

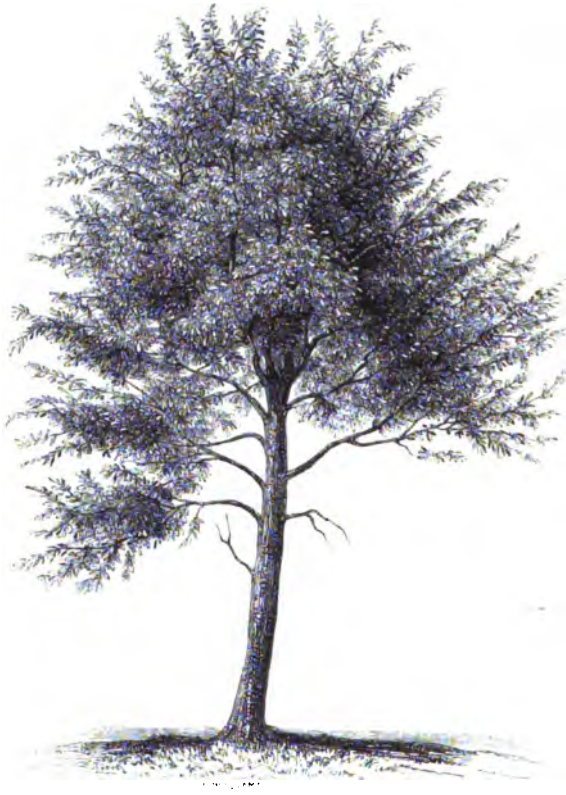
grown; and that those with a reddish heart, last twice as long as those in which it is light-coloured or white. It is also used by shipwrights, whenever it can be procured of sufficient size, as it possesses qualities which render it superior even to the live oak or the red cedar; the supply, however, for this purpose is very limited, as in those districts where it abounds and thrives the best, nine tenths of the trunks do not exceed a foot in diameter. It is also used almost to the exclusion of all other woods for trenails in the American sea-ports; and, as we have previously remarked, these are now extensively exported from thence to England and other parts of Europe.

In the old American States, where the Locust is now frequently planted (all remains of the ancient forest being nearly obliterated), it has often been attacked by the larva of a moth (*Cossus Robiniæ*), which penetrates and feeds upon the living wood; in the same manner as the *Cossus ligniperda* does upon that of the oak, willow, &c. in England.

In the extensive list of pseud-acacias contained in the "Arboretum Britannicum," we find that the largest specimens growing in England, have attained, under favourable circumstances, a diameter of upwards of three feet, and a height varying from forty-five to eighty feet. The finest in Scotland according to Sir T. Dick Lauder, are at Niddrie Marischall near Edinburgh, where the largest measured, some five or six years ago, nine feet in circumference at three inches above the ground. This tree divides into two great limbs, which then measured respectively five feet four inches, and four feet four inches in girth. At Twizell, it is two feet six inches in girth at one foot from the ground, and upwards of thirty feet high at the age of twenty years.

Among the varieties of the species, best worth cultivating for their appearance and deviation from its normal form, are the R. *p. umbraculifera*, Parasol Acacia; R. *p. pendula*, Weeping Acacia; R. *p. spectabilis*, a thornless variety, with large leaves and of rapid growth, raised from seed at St. Denis by M. Descemet, and R. *p. stricta*, Upright-growing Acacia.





Nat. Ord. Rosaceæ.

Cerasus Juss. — Linn. *Syst. Icosandria Monogynia.*

Cerasus Sylvestris, Ray.

WILD CHERRY TREE, OR GEAN.

Cerasus Sylvestris.	Ray, Hist. 1539.
	Loudon's Arb. Brit. part iii. ch. xlii. p. 693.
Cerasus avium.	Don's Mill. ii. p. 505.
Prunus avium.	Linn. sp. pl. 680.

Whatever difference of opinion may exist among botanists and horticulturists as to the origin of the culti-

vated Cherry, whether it was in reality brought from Asia into Italy by Lucullus, nearly two thousand years ago, as Pliny relates, or originated, as others suppose, in some other part of Europe from the Wild Cherry, we shall not stop to discuss, but proceed at once to the consideration of that species, which, under the names *Prunus avium* of Linn., and *Cerasus sylvestris*, Ray, &c., and known to us by the various local names of the Wild Black Cherry, the Gean, Merries, Merry-tree, is allowed to be indigenous in many parts of continental Europe, and considered also by many to be so in England as well as in Scotland. By such of our writers as have mentioned the Wild Cherry, it has been treated more in the light of an ornamental and fruit tree, than as one to be cultivated for the sake of its timber. Evelyn's notice of it is short, and scarcely alludes to the quality of the wood and the uses to which it is applicable; by more recent authors, (with the exception of Boucher, who inserts it in his list of forest-trees in terms of high commendation,) and in the various treatises that have been published of late years respecting the planting and management of timber trees with a view to profit, the Cherry is entirely omitted and lost sight of, a circumstance at which we cannot but express surprise, considering the magnitude the tree attains, the value of its wood, and the various purposes to which it is applicable, both for in-door and out-of-door purposes.

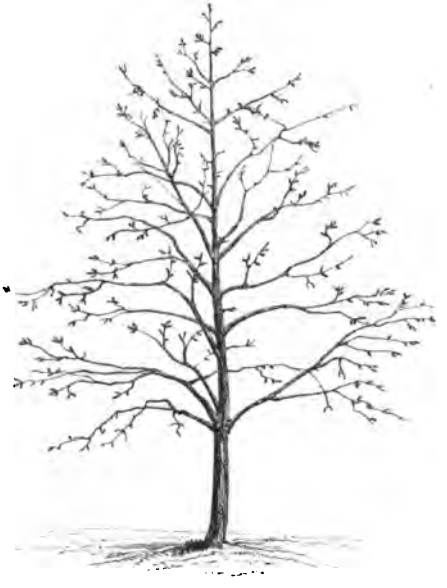
Our attention has been directed to this tree for some years past, in consequence of certain facts that came to our knowledge, respecting the durability of its wood when exposed to the alternation of moisture and dryness; and after having viewed it in its respective bearings, viz. that of a tree calculated to produce timber of considerable magnitude and excellent quality, as one well adapted to plant

as a nurse or intermediate occupant in mixed plantations, and where the oak is intended to remain as the ultimate crop, and also as an underwood applicable to various minor purposes, we have no hesitation in recommending it strongly to the attention of the planter, feeling assured he will find it much better calculated to repay him for its occupancy in all its stages than several other trees, which unfortunately are now too frequently introduced in mixed plantations, such as the beech, wych elm, or even the ash, except where the latter is intended to form the principal and ultimate crop of timber. In a soil of tolerable quality, provided it be not too wet, the Gean frequently attains a height of from sixty to seventy feet in the course of fifty or sixty years, with a trunk of proportionate size, and large enough for all general purposes; in this state its wood is of great value, being of a firm strong texture, red coloured, close grained, easily worked, and susceptible of a fine polish: these qualities render it a desirable material to the cabinet maker, and the furniture made of it is little if at all inferior, both in respect to beauty and durability, to that of the plainer kinds of mahogany.

In this country, where the wood just mentioned has in a great measure superseded all other kinds in our articles of furniture, and where the Cherry tree has never been cultivated to any extent as a timber-tree, it is rare to meet with specimens of furniture made of its wood; but in France and other parts of the continent, where it abounds, it is extensively used for this and various other purposes, and is eagerly purchased by the cabinet maker, the turner, and the musical instrument maker. Its value, however, is not restricted to the uses made of it by those artisans, it is equally applicable to out-of-door uses and general carpentry; and where exposure to the atmosphere or the

alternation of dryness and moisture is required, it is superior to most other timber we possess, and is only inferior to the best oak, or its rival the larch.

This durability, or power of resisting decay under such circumstances, renders it valuable even at a young age, or as soon as it is large enough to make posts, railing, &c.



The growth of the Cherry in its progress to maturity, is pyramidal, or of the candelabrum-like form; the branches springing from the main stem at regular intervals, or at the commencement of each annual shoot; and as its spray is stiff, strong, and open, it does not yield to but stoutly resists the blast: it is, therefore, one of the few trees that can be advantageously planted as a nurse or subsidiary to the oak, as it is neither apt to overtop or crush its neighbours by a rampant growth or wide spreading head like the wych elm or the ash, or to hurt and injure them in winds and

storms, as is constantly the case where trees with a more flexible or easily agitated spray are introduced. It has also this further recommendation as a nurse to the oak, that, although a quick growing plant while young, and fulfilling the duty of a protector, it naturally yields to the tree it has fostered after the first twenty or thirty years of its growth, and is afterwards content to vegetate beneath its shade, rendering it even as a mere neighbour the least dangerous to oaks in cases of neglect, or where regular thinning has not been duly administered. On account of these qualities, we recommend it to be freely introduced as a subsidiary to the oak in all plantations where the soil is of tolerable quality; in such it soon begins to make a return, and becomes fit for a variety of purposes. The first thinning, which may take place about the fifth or sixth year after planting, will afford good corf and crate rods, hoops, &c.; the second, two or three years afterwards, clean straight poles, fit for the hop-yard, or small railing; after this, it furnishes railing of a larger size, and posts which have been found to be very durable. Such of the trees as are allowed to attain a greater age, say twenty-five or thirty years, acquire size sufficient for gate-posts, barrel staves, and other uses which will repay the planter for its occupancy, and this without injury to the oaks which are intended to remain as the final crop.

By producing suckers in abundance, it also furnishes a plantation with a profitable underwood, which may be cut over every five, six, ten, or more years, according to the purposes to which it is meant to be applied. This sucker-bearing propensity also renders it an eligible tree for narrow belts of plantation, as it furnishes an underwood without trouble or expense; and in those cases (unfortunately of too frequent occurrence) where thinning has been too long

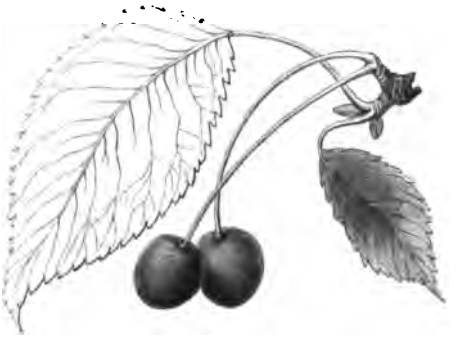
neglected, and where its tardy application leaves nothing but a set of miserable starvelings and hide-bound poles with brush-like heads, the Gean, instead of lingering like many other species in this hide-bound state, speedily sends forth a race of auxiliary ground stems to restore the plantation, and to become either useful poles for fence-wood or principal trees of considerable value and handsome appearance, where their original neighbours have died or decayed through neglect.



As an ornamental tree it is also well worth cultivating, as it produces a profusion of flowers from an early age, and at an early period of the year; these, from their snowy whiteness, contrast well with the blossom of the almond and the scarlet thorn. Its foliage, also, is handsome, though rather too uniform and unbroken to produce picturesque effect; in the autumn, when it assumes a deep purplish red colour, it gives great richness to the

landscape, and contrasts well with the yellows and browns which predominate at that season.

The fruit of the Wild Cherry, well-known by the name of Gean, is generally of a deep blackish red when ripe, sometimes of a bright red; and trees with berries of the latter colour are said to be more vigorous in growth, and to attain a greater size than the black-fruited kind, a fact, however, we have not been able to verify from our own experience.



The berries are sweet, with a rich but peculiar flavour, and much inferior in size to the cultivated varieties. They are used to make a jelly or rob, and in the manufacture of liqueurs, such as Cherry Brandy, Ratifia, &c. In France, where the tree used to abound, the fruit constituted the chief food of the wood-cutters and charcoal-burners in the forests, being made into soup with bread and a little butter.

Kirschwasser, an ardent spirit much used upon the Continent, is also made from it in Germany and Switzerland, and the famed liqueur *Maraschino* is the product of a small acid cherry that abounds in the north of Italy and in Dalmatia. The Gean is a favourite food of the Blackbird and Thrush (*Merula vulgaris* and *musica*), also of the

Black Cap *(Curruca atricapilla)*, and Greater Petty Chaps *(Cur. hortensis)*, two of our migratory warblers.

The foliage is seldom disfigured by insects or larvæ, though the caterpillars of some species of the Geometridæ occasionally feed upon it; the ends of the young shoots are often attacked by a large black aphis *(Aphis Cerasi)*, but the cultivated varieties seem more subject to it than the wild trees.

Though plants may readily be obtained from the suckers which the roots throw up, or by layers from stools appropriated to the purpose, the best mode of raising them when intended to be planted upon an extensive scale is from seed. For this purpose the cherries should be gathered when fully ripe, and either sown immediately, which we think the better way, or else mixed with earth or sand and kept under cover or in a cellar till January or February; during this time they should be frequently turned over, and care taken to prevent their sprouting until they are sown, which ought not to be later than the end of February or beginning of March. At the end of the season, if sown in good soil, many of the plants will have grown to the height of sixteen or eighteen inches; these may be drawn out from among the smaller plants and transplanted into nursery rows, from whence they will, in another season, if required, be fit to be transferred to the plantations.

The Cherry requires very little pruning, and the knife is only to be used for the removal of a second leading shoot, or an over-rampant branch. When this is required it ought not to be done till the leaves are fully expanded, a rule which holds good, and ought to be observed in regard to all other deciduous trees: it is then much less liable to bleed or exude gum, and as the tree commences to elaborate its sap and form alburnum, or new wood,

the edges of the wound immediately begin to heal, and the new wood advances upon and covers by degrees the surface of the cut; this keeps rapidly increasing, so that by the end of the summer, or rather the fall of the leaf, a great portion of the wound will be found cicatrized, or covered with a layer of new wood, and any decay from the lodgment of wet in a great measure prevented.

No tree bears transplanting when of considerable size better than the Gean, and we have removed with success plants from twenty to thirty feet in height, some of which had originated from suckers, others from the seed. As in the case of all trees that we have removed of a large size, they suffered a check by the operation, but from this they generally recovered in the course of two, or, at most, three seasons.

To the specimens mentioned by Loudon, the largest of which seem to average about nine feet in circumference, we may add several trees at Dunston Hill, near Newcastle-on-Tyne, the seat of Ralph Carr, Esq.; one of these, growing upon the lawn, measures seven feet in circumference at two feet from the ground, and three others, in a small plantation, are respectively five feet six inches, five feet three inches, and four feet eleven inches in circumference, with a height of upwards of fifty feet.



Genus *Cratægus* LINDL.

LINN. *Syst. Icosandria De-pentagynia.*

Cratægus Oxyacantha, LINDL.

WHITE THORN.

Cratægus Oxyacantha.	LINN, sp. pl. 683.
	HOOK, Fl. Scot. 151.
	LOUDON's Arb. Brit. part III. ch. xlii. p. 839.
Mespilus Oxyacantha.	SMITH's Eng. Flor. ii. p. 359.

THE White Thorn has so long been accustomed to rank as a mere hedge plant, that its introduction into a work like the present, professing to treat of forest-trees, may,

perhaps, cause surprise, and some of our readers may think that, in doing so, we have invested it with a character it does not possess or deserve; as our apology for its introduction, we refer them to the statistics of this tree contained in the "Arboretum Britannicum;" there they will find a list of Hawthorn trees recorded, growing in various parts of England, Scotland, and Ireland, with dimensions sufficient to entitle them to be considered as trees of the second and third magnitude; many of these are stated as possessing trunks with circumferences varying from four to upwards of ten feet, and a height, though not always corresponding to the strength of the trunk or the spread of the head, in some instances as much as forty-five feet. In addition to those recorded in the above-named work, we know of many other instances in which it has attained a timber-like size, and, if required, could furnish another list, nearly as ample as that of Mr. Loudon's: many of these are in natural or wild situations where the plant has sprung from the seed, others have been planted and their after-growth carefully attended to. Among those of the latter description, two of the finest we have seen are now growing at Jardine Hall, Dumfriesshire, the seat of Sir William Jardine, Bart.; the largest of these has a stem of seven feet eight inches in height, the circumference of the trunk at one foot from the ground eight feet, and at the insertion of the branches eight feet six inches, and the diameter of the circle overspread by the branches is nearly fifty feet. Both of these are trees of elegant and picturesque form, with falling or slightly depending branches, devoid of that rounded or cabbage-like head, which the Thorn so frequently exhibits in parks and lawns, or in situations where, during youth, it has been kept down by the shade and drip of other trees, or been cropped and browsed on by cattle. The tree whose mea-

surements are given as above is now one hundred and thirty-two years old, having been planted in 1708.

To attain a timber-like size, the Hawthorn requires to be planted in a dry loam, and if a little gravelly it seems the more congenial to its growth. But soil and situation are not the only requisites to be attended to in the culture of the Thorn as a tree; much depends upon the nature and habit of the plant selected, for as they are wont to vary from each other, when produced from seed, some exhibiting a strong, free, and upright growth, with large leaves and few spines, others a close, branching, fastigiate growth, with numerous spines, and others, again, with slender twigs and drooping branches, dwarfish in aspect, and with small, deeply-cut leaves, it is evident that, unless plants of the nature of the first variety, or those of a free, upright growth are selected, little expectation of a tall, well-proportioned tree can be entertained; and of the great extent of this variation of form and habit in seedlings of this tree our readers have only to inspect a few hundred yards of quickset fence to be convinced of the correctness of the remark.

In regard to its claim to picturesque beauty, we fully participate in the opinion expressed by Sir T. D. Lauder, in his valuable edition of Gilpin's "Forest Scenery," that due justice has not been done to its merits, and that it has been too hardly dealt with by that author; this we have the less hesitation in doing, having oft enjoyed opportunities of seeing it, and with kindred feelings, in the very situations and under circumstances similar to those so ably depicted by the accomplished editor.

In this northern district it is one of the greatest accessories to the beauty and scenery of our denes and deep ravines, and few, that are at all wooded, but owe a great

portion of their interest to the presence of this tree; as a proof of its effect in such localities, we might instance the ravines in the neighbourhood of the Pease-Bridge, on the great northern road between Berwick and Edinburgh, where large and ancient Thorns are seen mixed with a few detached and knarled oaks, the vacant spaces enriched with the golden blossoms of the Whin.

Being comparatively rare as a tree of timber-like size, the wood of the Hawthorn is not so plentiful as to make it applicable to general purposes, for many of which, indeed, its aptness to split and warp in drying, would, even if abundant, in a great measure disqualify it. Independently of this objection, it is of a firm, hard texture, and close grain, susceptible of a fine polish, of a pale yellowish white colour; when green, it weighs, according to Loudon, sixty-eight pounds, twelve ounces, per cubic foot, and loses upwards of ten pounds in the process of drying, as its weight is then found reduced to fifty-seven pounds three ounces.

It makes good and durable cogs or teeth for mill-wheels and other machinery, handles for hammers, mallets, and other articles where a firm, tough wood is required.

As a fuel, it ranks among the best, giving out much heat, and burning as freely in a fresh, as in a dried state. The Hawthorn, as a hedge plant in England, is said to date from the time of the Romans, but however this may be, there is no doubt, from the mention made of quickset hedges, and the directions given for constructing them in the oldest works we possess on husbandry, that they have been, at least, in partial use for three or four hundred years. At this early period they appear to have been made for the protection of plantations, garden grounds, and small paddocks in the immediate vicinity of dwelling-houses, and on such occasions, the Thorn was frequently mixed

with the holly, the plants being then collected in the woods, as nurseries for the rearing of the Thorn do not appear to have been generally established much prior to the time of Evelyn.

On a more extended scale, as the enclosing of corn-fields, meadows, &c., Hawthorn hedges, according to Loudon, were not generally planted in England till after the introduction of the Flemish husbandry into Norfolk, about the end of the seventeenth century. In Northumberland and other parts of the north of England, the greater proportion of quickset hedges have been raised within the last eighty years. In Scotland, Dr. Walker states that the first Hawthorn hedges were planted by some of Cromwell's soldiers, one instance being the road leading up Inch-Buckly-Brae, in East Lothian, the other at Genlarig, at the head of Loch Tay, in Perthshire; the general fencing of what used to be termed the outfield parts of farms did not, however, take place till a much later period.

The nature as well as the limits of our work will not permit us to enter upon the subject of raising quick hedges in detail, but this we regret the less as ample instructions have already been given in various publications; and we can confidently refer our readers to what is contained in the Encyclopædia of Agriculture on this subject, as well as to the remarks upon fences by Mr. Stephens, in the Quarterly Journal of Agriculture. We may, however, be allowed to remark, that after trial of various modes, we prefer planting the quicks upon a flat surface, either in single or in double lines, the plants growing quicker and forming a fence in a much shorter time than when planted upon the edge of a ditch with a high mound or dyke behind them. It must, however, be observed, that when thus planted upon the surface, if intended to form a fence

between two fields, they require a railing on each side for some years. The ditch and dyke mode, on the contrary, is a fence without further expense, and there is little doubt but that this plan of fencing was at first adopted in consequence of the naked state of the country, and the impossibility of procuring railing sufficient to protect the young quicks; this want has now, in most districts, ceased to exist, as plantations have sprung up in all directions, and railing can be had at a very cheap rate; but old habits are not easily overcome, and it is well known how difficult it is to induce a departure from ordinary practice, even where a plan as easily executed and more advantageous is proposed to supply its place.

Thorns for hedge-plants are reared from the seed, not but that cuttings of the roots of old plants will answer very well and grow rapidly, as we have ourselves experienced, but as these can only be had where an old hedge has to be taken up, it is only occasionally that they become available for replanting.



The haws should not be gathered before the end of October, or in November, as they are seldom fully ripe

before that time; and as the seeds do not vegetate till the second year, it is usual to mix the haws with sand or dry earth, and turn them frequently over for the first year, in order to hasten the decomposition of the pulp and separate the seeds.

They are sown in beds in the February or March of the second year, being covered with fine soil to the depth of about a quarter of an inch. Many of the seedlings will be strong enough at the end of the first year's growth to be thinned out and planted in nursery rows, and the remainder in the autumn of the second year, and after remaining two, or sometime three years in the nursery rows, they are fit to run into the hedge rows.

The Common Thorn is also used as a stock whereon to bud and graft the numerous varieties of the species, as well as other species of *Cratægus*; indeed its usefulness does not end here, as it also serves as a stock for several allied genera, such as *Mespilus*, *Sorbus*, *Pyrus*, *Cydonia*, &c., a quality which, as Loudon well observes, might be advantageously made use of to render our field-hedges ornamental, as well as productive of useful fruit.

Amongst the several varieties of the Thorn, of which no less than twenty-nine are enumerated by Loudon, the most elegant and best worth cultivating are those with scarlet or pink flowers: the *Cr. ox. rosea*, a variety that has been long in cultivation, has the petals red, with white claws; the *Cr. ox. punicea*, a later variety, has the petals wholly red and larger than those of *C. rosea*; Loudon mentions a scarlet Thorn with double flowers, but this we have not seen. The next in beauty is the *Cr. ox. multiplex* with large double white flowers, which fade or die off deeply tinged with a delicate pink hue. Among the other varieties, the *Cr. ox. præcox*, or Glastonbury Thorn, which

comes into leaf and flowers about Christmas, is one of the most interesting. The other varieties are grown more on account of their departure from the type or species, than for any peculiar beauty they possess.

The Hawthorn is indigenous throughout Britain, and according to H. C. Watson, extends to a height a little above that attained by the common whin, *Ulex Europæus;* it is also a native of the greater part of Continental Europe, and is found in North Africa and the western parts of Asia.

In England the Hawthorn is very generally known by the name of May or Maybush, from its connexion with the floral games, the recognition of which, from the times of the Greeks and Romans, has come down to us in the celebration of May-day, and the erection of the May-pole, which, in the south of England, is always surmounted with a wreath or ornament of Hawthorn flowers.



The foliage affords food to many insects, several of these being the larvæ of lepidoptera: among these may be par-

ticularized *Episema cæruleocephala*, *Trichiura cratægi*, *Clisiocampa neustria*, the larva of which in some years abounds in such myriads as entirely to denude the hedges of their early foliage throughout large districts. *Porthesia chrysorrhea* and *Porthesia auriflua* also periodically commit great devastation. The flowers also are the resort of a vast variety of coleopterous and other insects, and afford a rich harvest to the entomologist during their expansion.

As an undergrowth in woods and plantations the Thorn deserves to be encouraged, as it not only becomes an excellent cover for game, but acts as a protector to other trees, and with this view it is recommended by Sir Uvedale Price to be planted in thickets, where, without further fencing, it might act as a nurse and protector to other timber trees planted amongst it.





Genus *Pyrus* LIND. LINN. *Syst. Icosandria Pentagynia.*

Pyrus Aucuparia. GÆRT.

FOWLER'S SERVICE TREE, OR MOUNTAIN ASH.

Pyrus Aucuparia. GÆRT. Fruct. ii. p. 45. 687.
SMITH'S Eng. Flor. ii. p. 364.
DON'S Mill. Dict. ii. p. 648.
LOUDON'S Arb. Brit. ch. xlii. p. 916.

Sorbus Aucuparia. LINN. sp. pl. 683.

Provincial. Rowan, Roan, Witchen Tree.

HAVING already admitted the Holly and the White Thorn within the limits of our work, we can scarcely refuse the claim of another tree, which, in many situations, equals the largest specimens of either of the other two, and which frequently assumes a picturesque character and appearance, and gives a value and heightened interest to wild woodland and mountainous scenery. The tree we allude to is the Mountain Ash, which grows in almost every district of Britain, but whose favourite habitats and where it reaches its greatest size and most imposing appearance, are mountainous declivities, or in those deep dells in mountainous and hilly districts, where the earth is loose and free, and kept in that moist state most congenial to its growth, by the percolation of the rain and dews, or of springs which issue from the disruptured rocks. In such localities it frequently becomes a tree of the second or third magnitude, with a form generally devoid of that stiffness and round-topped outline it usually assumes under cultivation, or as seen in dressed and garden grounds. In old trees situated in such wild scenery, the branches lose their formal appearance, and as they become elongated and unable to sustain the annually increasing weight of the foliage, gradually yield and take a partially pendant direction. Such are many of those groups which claimed the approving notice of Gilpin, and which we have oft admired in the wild and enchanting scenery of the Scottish Highlands; and such were the old and venerable trees in our own romantic dene at Twizell, before the destructive storms of the last few winters overthrew and laid low the leafy honours of the largest and finest among them. In addition to a light and graceful foliage, charming us with its fresh and lively tint, the Mountain Ash, in spring, bears conspicuous and sweet-smelling corymbs of

cream-white flowers, and as the autumn advances, its berries, of the richest coral hue, give it a singularly pleasing and beautiful effect ;—

> " How clung the Rowan to the rock
> And through the foliage showed his head
> With narrow leaves and berries red:—"

and add to the contrast produced by its mixture with the deep green of the pine, and the tufted and waving foliage of the spiry birch, two of the usual and most predominating trees in those localities in which it most delights. It is not, however, to be despised, or its cultivation neglected, in scenery of a tamer and less stirring description, and, loaded with its rich and glowing fruit, it is one of the greatest ornaments to the pleasure gardens of suburban villas.

As a timber tree, the usual dimensions of the Mountain Ash prevent its application to purposes requiring wood of a large scantling ; but being fine grained, hard, and susceptible of a high polish, for smaller manufactures, such as handles to hammers, knives, and forks, and for various articles in turnery, musical instruments, &c., it is considered equal to that of its congeners, the *Pyrus aria* and *Pyrus torminalis*. It is as an undergrowth that it is most valuable to the planter, producing a quick return and affording tough poles, and excellent material for hoops, crates, corf baskets, &c. As a nurse plant to the oak and other trees in exposed districts, it is also, from its constitutional hardihood, amongst the best that can be used ; for, as Loudon very justly observes, " being incapable of being drawn up above a certain height by culture, it does not interfere with the growth of the other trees, but after having done its duty as a nurse, quietly submits to be overtopped and destroyed

by the shade and drip of those it was planted to shelter and protect;" or else, as the other trees are thinned out, it may be cut over and kept up as a permanent and profitable undergrowth. The fruit of the Mountain Ash is a favourite food of all the thrush tribe; and in Germany, and other continental parts, where the smaller species of game is eagerly sought after, and highly esteemed for the table, the horse-hair nooses by which they are caught in the woods are baited with the berries of the Mountain Ash. The berries are also sometimes eaten as a fruit, and we have seen them exposed for sale in the streets of Glasgow, but they are harsh and austere to the taste, besides possessing an unpleasant and peculiar flavour similar to that conveyed to the smell by the green or recently cut wood. When fermented and distilled, they yield a strong ardent spirit, and in Wales they used to brew a beer or ale from them, which Evelyn records as "incomparable drink familiar in Wales."

Of the superstitious notions, and supposed virtues formerly attached to the Rowan tree, some slight and lingering remains are still occasionally to be found in remote and sequestered districts, and a dreamy supposition of its power to avert the influence of what is called the "evil eye" is at times acknowledged. These notions, however, are likely to be entirely forgotten, since education has become more diffused, and a free intercourse and access, even to the remotest districts, has been opened by our steamboats, railroads, and other improvements, and the ancient and reverential honours paid to the Witchen tree, will soon be only known by tradition and by what has been recorded in the writings of the olden time.

The Mountain Ash is readily propagated from the seed, which it produces in large terminal clusters at an early

age; the pomes or berries ripen in September, and are then a rich addition, from their warm and glowing effect, to the foliage of the woods. If wanted for seed, they ought to be gathered as soon as they are fully matured; otherwise they rapidly disappear, the gastric powers of the thrush tribe being in constant activity, every member of the family voting them a delicious repast, and never deserting the vicinity of a fruit-bearing tree until the whole of its produce is consumed.



The berries may be sown immediately after being gathered, or else kept, during the winter months, in any cool place, and mixed with sand or light earth, and frequently turned over, in order to decompose and get rid of the investing pulp, and not sown till March or April. The seed beds ought to be made up of fine pulverized earth, and the berries not sown too thick, and but lightly covered. The growth of the young plants is rapid, and they are mostly fit to run into nursery rows the following spring, from whence, in the course of another season, many will be found large enough to transplant into their permanent stations.

Few insects seem to feed upon the foliage of the Mountain Ash, and the only species of Lepidopterous larva we have occasionally found upon it have been those of *Rumia cratægata* and *Campæa margaritata*.*

Of the other indigenous species of this section of the genus we need only make cursory mention, as they seldom attain a timber-like size, or even reach the proportions of the Mountain Ash. The commonest species, and one that braves the most exposed situations, and reaches in mountainous districts a high elevation, is the *Pyrus aria*, the White Beam tree, distinguished by its ovate-shaped leaves, with their under surface covered with a white down. We consider it well adapted for nursing or protecting other young trees, when first planted, and in exposed situations, as it shelters them, without interfering with their growth, always carries itself erect, and, from its stiff, upright-growing branches, is not acted upon by the most violent winds. Its wood is very hard and of a fine grain, and where it grows in any quantity is extensively used for the cogs of wheels in machinery, as well as for various articles in turnery, and small manufactures. It is found throughout Britain affecting chalky or limestone districts,



* Our figure of the Mountain Ash is taken from a tree growing in Twizell Dene. In the same locality we measured one of four feet two inches in circumference, at two feet from the ground, another of three feet ten inches, and another of three feet five inches, but trees of a much larger size were overthrown by the snow-storm of 1838, and by the hurricane of Jan. 7, 1839.

and to attain its full proportions requires room and air. The finest specimens are said to be those in the neighbourhood of Blair in Perthshire.

The fruit of this species, nearly twice the size of that of the Mountain Ash, is of a mealy consistence and pale red colour when ripe, very sweet, and without any bitterness or astringency. In autumn, we have seen the fruit resorted to by different moths, particularly by two species of *Glæa* and *Calocampa exoleta*.



The other species is the *Pyrus torminalis*, Griping-fruited Service tree, not so common, nor found in such exposed situations as the former, being, indeed, confined to the southern and midland parts of England. It sometimes grows to the height of fifty feet and forms a round-headed tree. Its wood is valuable, possessing qualities akin to those of the wood of *P. aria* and *P. aucuparia*, but without the peculiar strong smell they emit; and it is

used for similar purposes. The leaves of this species are cordate-ovate and pinnatifidly lobed, and, when young, slightly downy beneath; they are nearly four inches long and three inches broad in the middle. The fruit, which, when ripe, is of a brownish red colour, is produced in large terminal bunches, the berries round and compressed, and when in a state of incipient decay similar to the medlar in flavour, and are brought to market both in England and France. It is of slow growth and lives to a great age.

As for the *Pyrus sorbus*, True Service tree, it is so rarely met with in Britain, and seems so difficult to propagate, from its fastidiousness as to soil and situation, that we cannot even admit it into our Sylva as a tree long introduced, much less as a native, to which it appears to have no claims whatever. It reaches a greater size and height than any of the other species, and its wood possesses qualities of the same nature, being hard, heavy, and compact in texture.





Nat. Ord. Oleaceæ.

Genus *Fraxinus*, TOURN. LINN. *Syst. Polygamia Dioecia.*

Fraxinus Excelsior, LINN.

COMMON ASH.

Fraxinus excelsior.

LINN. sp. pl. 1509.
SMITH's Eng. Flor. i. p. 14.
HOOK. Sect. iii.
DON's Mill. iv. p. 53.
LOUDON's Arb. Brit. part III. ch. LXXV. p. 1215.

The Ash, whether considered in reference to the valuable qualities of its wood, or the claim it has to the title of a noble and ornamental forest-tree, must always form a prominent feature in a British Sylva. In point of magnitude it ranks as a tree of the first class, and though it may yield in circumference and vastness of trunk to some of our ancient oaks, yet this,—the Venus, as it has been called, of the forest,—frequently towers in height above the Herculean monarch of the woods. Of the dimensions of the most celebrated trees of this species an extensive list is given in the "Arboretum Britannicum," containing not only those extracted from the most authentic authors, such as Lauder's "Gilpin," Strutt's "Sylva Britannica," &c., but also an additional number from return papers sent to the author of the first-named work. In this list we find several Ash trees, from twenty to thirty feet in circumference, with a height varying from seventy to ninety, and even one hundred feet. The great Woburn Ash is ninety feet high, twenty-three feet and a half in circumference at the ground, with a clean stem of twenty-eight feet; this tree contains eight hundred and seventy-two feet of solid timber. In Wiltshire there are many trees with clean stems of fifty feet and from nine to twelve feet in girth. In Scotland, the great Ash at Carnock, in Stirlingshire, is ninety feet high, the circumference at the ground thirty-one feet; the solid contents are six hundred and seventy-nine cubic feet; this tree is now upwards of two hundred and forty years old, having been planted about 1596. In the neighbourhood of Morpeth, Northumberland, where the Ash grows very luxuriantly, there are many fine and highly-ornamental trees; among them is the Cowpen Ash, figured as a sub-variety in the "Arboretum Britannicum,"—a tree that, from the elegance of its growth,

must frequently have attracted the notice of travellers passing along the northern turnpike, close by the side of which it grows, about a quarter of a mile to the north of Morpeth. There are, also, other trees exhibiting the same peculiarity of growth on the road between Morpeth and Mitford Castle, upon the banks of the Wansbeck: one of very striking appearance grows a little above the



bridge nearest to Morpeth, and another, equally so, about a mile above Mitford. In addition, we may mention a fine, thriving young Ash, growing in the bottom of a dell about a mile and a half from Morpeth. It rises with a

clean stem of thirty-one feet, with a circumference near the ground of twelve feet, and contains two hundred and sixty-six feet of solid timber. At Kirkley, also, there are some magnificent Ash trees, and at Whittingham, in the same county, two fine old trees grow near to the Inn.

As an ornamental and picturesque tree the claims of the Ash are fully admitted by various writers, whose opinion and taste are acknowledged by all. Virgil we know has designated it as,

——————Fraxinus in sylvis pulcherrima;

Gilpin speaks of the beauty and lightness of its foliage, and the fine, easy, flowing line of its stem and branches; Sir T. Dick Lauder, whose taste and pictorial powers are so frequently evident in his valuable edition of "Gilpin's Forest Scenery," though he states the disadvantages under which it labours, considers it, notwithstanding, a noble and magnificent tree; Strutt, also, whose "Sylva Britannica" has furnished us with exquisite illustrations of our finest trees, speaks of the Ash in laudatory terms, not only of its beauty in tranquil scenery, but of its effect in scenes of a wilder and more stirring kind. "It is," he says, "in mountain scenery that the Ash appears to peculiar advantage, waving its slender branches over some precipice which just affords it soil sufficient for its footing, or springing between crevices of rocks; a happy emblem," he adds, "of the hardy spirit which will not be subdued by fortune's scantiness."

The principal objections attending the Ash seem to be the following: first, the very late period of its coming into leaf, which, in the north of England and Scotland, even in seasons of average fineness, rarely takes place before the beginning of June. Our notes specify the fourth and sixth of that

month as days on which the leaves have frequently been observed to expand; the two last seasons, however, viz. 1838 and 1839, have been much later, and the Ash did not come into leaf till the end of the month; the full expansion in this neighbourhood, on the former year, was not effected before the 22d, and, in 1839, not till the 26th of that month. The second objection is the rapid fall of the leaf after the first autumnal frost, however early that may happen, and this, in general, without undergoing any change of colour, or contributing by the "sear and yellow leaf" to the waning beauty of autumnal foliage. These disadvantages attending the Ash are serious impediments to its being planted where ornament alone is the object, and this Sir T. D. Lauder endeavours to enforce, by observing, "Ash trees should be sparingly planted around a gentleman's residence, to avoid the risk of their giving to it a cold, late appearance, at a season when all nature should smile." This effect, and the correctness of his remark, we have often had occasion to observe in passing through districts where the Ash predominated.

The form and general appearance of the Ash is naturally affected by the situation in which it grows. In woods and plantations where it has to contend with other trees, it usually rises with a clean, straight stem to a great height before the head begins to expand, the side branches, when thus situated, decaying and being thrown off at an early period, from want of room and air. On the verge of woods, or when planted singly and unencumbered by other trees, though it generally carries up a leading stem, it throws out numerous side branches; these, at first, grow at an acute angle with the trunk, but, as they increase and lengthen, the weight of foliage and additional spray causes them to bend and take a sweep, thus pro-

ducing that depending spray and foliage, so much admired in the matured and full-grown Ash. Like most pinnate-leaved trees, the foliage of the Ash is light and graceful, hanging in loose and pendant masses, and well-adapted, as Gilpin observes, "to bring off and relieve the heaviness of less airy foliage;" the colour also, which is of a light and agreeable green, harmonises, and contrasts well with trees of a more sombre hue.

In cultivating the Ash with a view to profit, and where it is intended to form the principal crop of timber, it is best planted by itself without admixture of other deciduous trees, as from its mode of growth it proves one of the worst of neighbours in mixed plantations, particularly to the oak, which it lashes and destroys by its heavy and easily-swayed head; the larch, however, if thought necessary, may be used as a nurse, and would add to the value of the two or three first periodical thinnings. A plantation of Ash on this principle soon begins to make a return, the poles becoming valuable at an age much earlier than most other kinds of hard wood; and as the stools send up strong and vigorous shoots, there is never wanting a supply of underwood, convertible to many useful purposes. Thinning, in such plantations, ought to be freely administered, and should also be commenced at an early period, that is, within six or eight years after planting, as the Ash, upon favourable soil, will in that time have made a vigorous growth, rendering the saplings fit for hoops, corf rods, &c., and the larch of size sufficient for small posts, railings, &c.

It is from a want of attention to timely thinning,—one of the most important branches of Arboriculture,—that we see so many instances of unhealthy and stunted-looking plantations: these, whether as large masses or in the form of narrow belts, are, after the operation of planting, too

frequently allowed to grow unheeded and neglected for many years, without any attempt to improve their condition by gradual thinning and the necessary admission of light and air. In consequence of this treatment, continued, perhaps, for a period of eighteen or twenty years, or till the trees are supposed to be of sufficient size to repay the cost of thinning, an unceasing contest for bare existence has been going on, as each plant has been engaged in deadly strife with its surrounding neighbours, to obtain a glimpse of light and portion of air, the want of which, beneath their tufted tops, soon deprives them of all their lateral branches, (the natural feeders of the tree,) and reduces them to the condition of weak, bare, unseemly poles. In this enervated state, forced, as it were, in a sort of hotbed, and drawn up to a height to which, when exposed and thinned out, neither the bulk of their stem or the spread of their roots is at all proportionate, the axe is introduced, and that frequently to an extent that, in well-managed plantations, would only be admitted after gradual and repeated thinning. The consequence, as may be supposed, of this sudden exposure of the weakened, drawn-up plants to the influence of the winds and weather, is the blowing over of many, and an immediate check to the further growth and advance of the survivors, which soon assume that stunted and hide-bound appearance which so frequently meets and offends the eye, not only in narrow and exposed belts, but in all plantations where attention to proper and gradual thinning has been neglected. It then becomes a question, what had best be done with plantations reduced to this condition? whether they should be cleared entirely of their sickly tenants, and the ground replanted with a new assortment of trees? or can a remedy be applied that would tend to renovate

the dormant powers of the hide-bound plants and induce a new and vigorous growth? In some cases where the plantations are small and out of view, and where immediate shelter and appearance can be dispensed with, perhaps replanting might be advisable; but where the belt is extensive, and it is of importance, if possible, to preserve the trees already standing, the remedial plan, where the Ash predominates, should be attempted; this, which we shall call the disbranching, or head-renewing system, has been suggested by an Arboriculturist who, to theoretical adds, what is more essential, practical knowledge, and who has kindly communicated his management and *modus operandi* upon sickly and hide-bound Ash.

"To curtail the head of an old wind-shattered and unsightly Ash, or of a younger one that has become hide-bound, is a very different operation from that lopping of a vigorous tree, so deservedly reprobated. It is strictly in accordance with the principles of vegetable physiology, and is no less certain to invigorate the vegetative powers of the Ash than of the Hawthorn, when the latter is improved by the reduction of an old hedge to half its former height; and so far is the *remedial disbranching* from being contrary to nature and in bad taste, that the very omission of it is rather so, inflicting, as it does upon our sight, a languishing and chilling vegetation, on the verge of decay, without any of the interest of old age.

"Great numbers of Ash, reared in narrow and exposed plantations have, from want of proper and timely thinning, grown up too tall for the unprotected situation they now occupy. They have, consequently, become hide-bound and make no progress. It is in vain to deny that the real, and, indeed, the only remedy is a severe one, namely, to enable the tree to form a new head, more perfectly adapted

to its site, by first cutting off the branches that form the present summit. The saw should be applied first above the point where the secondary branches diverge from the principal ones; indeed, we may often observe, about this part and lower down, that nature is even giving a kind of hint that she is prepared to second us, for the young shoots which she annually sends forth from the stems of the branches would immediately expand and form a new head. About two-thirds of the entire height is often a proper point at which to cut, and in many a large tree most of the branches divided will not exceed the thickness of a man's arm, so that the wounds, considering they are in the most active part of the whole plant, will never prove injurious, but will generally be covered, in great part or entirely, by the advancing bark. The operation of cutting with the saw should not only be performed under the owner's eye, if possible, but each branch ought to be twice sawn, the first cut being merely to get rid of the weight of the branch, in order to prevent splitting, and the second cut very carefully made at the proper point, one or two feet lower down.

"The shoots of the first summer will, perhaps, be weak, but afterwards very strong, until a new head, capable of bearing every blast, has been completed, and we behold, instead of a tall and hide-bound victim to the winds, a sturdy, storm-defying Ash, spreading its boughs in characteristic beauty. So, too, the old, misshapen, wind-shattered Ash of the hedgerow may be taught to exchange its ragged, blackened twigs, for those fresher branches which its venerable trunk is still quite able to nourish, when relieved from the burden that was slowly yielding to every storm because its period of growth was past."

In many districts the Ash appears to have been planted

as a hedge-row tree to the exclusion of almost every other species, not so much, perhaps, for any supposed superiority as a tree of shelter, or for the ornamental qualities it possessed, as to ensure and keep up a constant supply of its valuable timber, so extensively used for all country and agricultural purposes. This custom of planting the hedge-rows, which added so essentially to the beauty and appearance of this country, we regret has fallen greatly into disuse from the belief that trees, and particularly the Ash, are injurious to the fences, as well as to the vegetation in their immediate neighbourhood. This apprehension we think is greatly exaggerated, and we have not discovered the drop from the foliage of the Ash to be more injurious to the growth of plants beneath its influence than that of the Oak, the Elm, and several other trees, or that its roots are much more exhausting in their effects upon the surrounding herbage. It is not disputed but that the shade of the Ash as well as of all other trees, by the interception of light and free circulation of air, must prove in some degree injurious to plants growing immediately beneath them; but where the hedge-row trees are not too numerous and planted at proper distances, the loss or injury can be but trifling, and is more than compensated by the shelter and amelioration of the climate they produce. Where the enclosures are small, hedge-row trees undoubtedly may be, and very frequently are, much too closely planted; they then prevent the necessary and free circulation of air, thereby producing much injury to crops by fostering and giving rise to blights, mildew, &c., as is frequently the case in England, where the enclosures are small and at the same time thickly wooded; but where the enclosures are large, the planting of hedge-row trees is, we are convinced, always attended with beneficial

effects, and ought to be steadily pursued by all proprietors, however opposed the tenants may be to the proceeding. In Northumberland, where hedge-row timber is so deficient, the prejudice against it, we fear, is not always confined to the tenant; this is much to be regretted, as there is no district that would be benefited to a greater extent by the adoption of the system than this portion of the kingdom, exposed as it is to the heavy blasts from the Atlantic, as well as those from the Eastern Ocean. It ought also to be kept in mind that the supply of this valuable timber is becoming every day more limited, and this, in a great measure, arising from the diminution of hedge-row trees, and although other timber, as that of the Wych Elm *(Ulmus montana)* has been substituted; the latter is generally acknowledged, by the carpenter, to be very inferior to the wood of the Ash, as neither possessing its elasticity, toughness, nor durability. We therefore hope that proprietors will not be deterred by the objections of their tenants, or by the unproved assertions of writers, from following the footsteps of their predecessors, but resume the praiseworthy practice of planting their hedge-rows, if not entirely with the Ash, at least with a due proportion of this valuable timber.

The wood of the Ash, though not so durable as the matured or heart-wood of the Oak, surpasses it, and all our other indigenous trees, in toughness and elasticity of fibre, on which account it is almost universally used in the fabrication of all articles where these qualities are particularly required. Thus, it forms the principal material in the making of such instruments and machines as are liable to sudden strains or shocks, and therefore is extensively employed by the maker of agricultural implements, by the coachmaker, wheelwright, &c. It is also

used almost exclusively for the handles of spades and shovels, as well as for axes, picks, &c., and its elasticity renders it one of the best materials for boat oars. In many parts of England milk-pails are made of thin boards of this wood, each rolled into a hollow cylinder, with a bottom affixed to it, and Loudon recommends it as particularly adapted for kitchen tables, on account of its not being liable to splinter when under the operation of scouring.

The Ash also possesses the additional recommendation of becoming useful when quite young, the wood being as durable and as perfect in regard to its other properties at a very early age, as it is when it has attained its greatest dimensions. Coachmakers, indeed, and other manufacturers, consider it to be best adapted to their purposes between the age of thirty and sixty years, as large trees of older growth are frequently found to have lost that elasticity and adhesiveness of fibre which constitute the peculiar excellence of the Ash, and to have become brittle and short, or, as it is called, *frush*, in the grain, in consequence of the decreased lateral adhesion of the annual layers.

From the early age of five or six years the planter begins to derive profit from the Ash, for we find that at this age it is fit to make into walking-sticks, the growth of which alone is found to be profitable in Kent, and other districts in the neighbourhood of London; at twelve or fourteen it is of a size sufficient to form hop-poles, hoops for casks, crates, and light hurdles, and for one or other of these various purposes it is extensively cultivated in Kent, Staffordshire, Wiltshire: the usual mode is to grow it in holts or coppices, which are either cut over entirely, at the end of a certain period, or else divided into portions, which are cut in succession each year, by

which means a constant and annual return is secured. When older, or as soon as it has attained a diameter of four or six inches, it becomes valuable to the cartwright and coachmaker, and at this size it cuts up to advantage for the handles of pitchforks, axes, picks, and agricultural instruments. It also makes excellent staves for the barrels in which pickled herrings are packed, and for this purpose alone would, in many districts, make a profitable return to the planter.

The wood of the Ash is of medium weight, being stated by Loudon to weigh, when green, sixty-four pounds nine ounces per cubic foot, and when dry, about forty-nine pounds eight ounces. The roots are frequently very curiously veined, or what is termed *cambleted*, and when polished make a beautiful appearance; on this account they are in demand with the cabinet-maker for the lids of boxes, small work-tables, &c. It also, at times, produces knotty excrescences which, according to Dr. Plott,* exhibit a beautiful surface when polished; and the twisted or fasciated branch, arising from some extraordinary flow or extravasation of the sap, and analogous to what is sometimes seen in the Holly, the Willow, and the Laburnum, is also occasionally met with upon the Ash.

The Ash burns as freely in the green state or when newly cut, as it does when dry, giving out much heat with a clear flame, and very little smoke; it also produces excellent potash, to make which the tops and loppings are generally consumed when the tree is felled.

The leaves of the Ash, when eaten by cows, are generally supposed, but we believe erroneously, to communicate an unpleasant flavour to the milk and butter: we have not been able to detect anything unpleasant in re-

* "History of Staffordshire."

gard to our dairy, although the cows have access to several Ash trees growing in and around their pasture, and in this opinion we are further supported by a statement contained in the " Arboretum Britannicum."

From Evelyn we learn that the seed, or keys, as they are commonly called, were, when green, pickled and preserved as a " delicate salading ;" we do not, however, venture to recommend this condiment upon our own authority, though we think it may prove as savoury as many other vegetable productions used in this way.

Some lingering superstitions still attach to this tree, for we find an instance related by the Rev. W. T. Bree, in the " Magazine of Natural History," where a ruptured child was made to pass through the chasm of a young Ash tree, split for the purpose, in Warwickshire, a superstition also noticed by Evelyn.

Another mentioned in the same work is that of boring a hole in an Ash tree and enclosing within it a living Shrew mouse ; the branch of a tree thus prepared is supposed to cure lameness and cramp in cattle, both of which are laid to the charge of the unfortunate mouse.

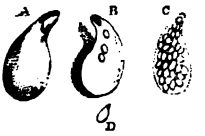
The Ash appears to attain the greatest perfection, in regard to the peculiar qualities which render it so valuable as a timber, viz., toughness and elasticity, in a free loam with a mixture of gravel. In many rich soils, though it grows with great luxuriance, and attains its largest dimensions, it is frequently brittle and short in the grain, from a deficiency in the lateral adhesion of the woody fibre, and this tenderness, as it is called, seems to increase with the age of the tree. Soil, however, we are convinced, is not the only cause that affects the timber, as we have found trees possessing very different degrees of excellence growing in the same soil and situation. The natural con-

stitution or habit of each individual tree, we believe, has more to do with the nature of the timber than is generally supposed or allowed. In cold and wet clays it never attains a great size, but always appears stunted; and though it has been recommended for low swampy soils, we are convinced it cannot be grown to profit in such situations, but will become diseased and unhealthy before it has attained the age of twenty years.

In glens and denes the Ash grows with great luxuriance, particularly when its roots can reach the stream which usually flows at their bottom; and it is often in such situations we find the cleanest and longest stems of this tree.

It is only in wet unsuitable soils that the Ash is subject to disease; and the canker appearing in black spongy masses upon the stem and branches, at once points out to the planter that his soil is not suitable, or at least that to become so it requires to be thoroughly drained.

In a living state, the stems and branches of the young Ash are frequently infected and covered with a species of *Chermes*,* or scale insect, which, feeding upon the juices of the trees, affects their health, and throws them into a declining state; this we have observed to prevail in Ash plantations which, after having been drawn up for several years, have then been suddenly thinned and left too much exposed. This chermes in shape resembles one found upon the apple tree, and another which infests the smaller willows, such as *Salix cinerea*, &c., and it contains a deep purplish red liquid, which probably might afford a valuable dye. In



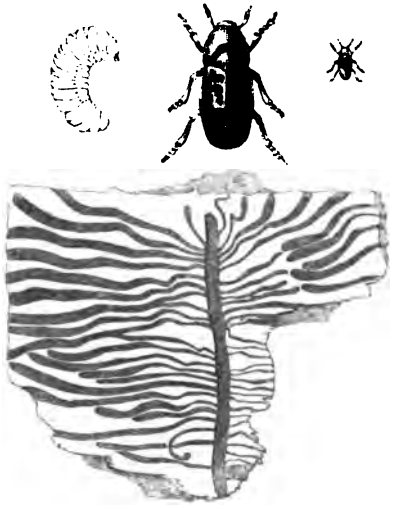
* Early in spring, on lifting the scales of the preceding year, each will be found to cover from twenty to thirty large purplish red, somewhat kidney-shaped eggs, or embryo young. These are hatched in April or May, and spread over the tree in myriads.

the annexed cut, A represents the back, or upper part of the scale magnified; B the under; C, the same filled with eggs; D the scale, natural size.

The leaves are also the food of the larva of several Lepidoptera, among which is that of the beautiful *Catocala fraxini*, and upon the continent, in France, Spain, &c., they are the food of the *Cantharis vesicatoria*, blister beetle, which frequently abounds to such an extent as to consume the entire foliage, and leave the Ash trees naked during the greater part of the summer; their presence, however, is attended with still more disagreeable consequences, as they exhale a pungent and unwholesome smell, and when dead upon the trees, and dried to a powder, the particles float in the air and are apt to be inhaled and to produce dangerous symptoms. In the 9th vol. p. 119 of the "Magazine of Natural History," we are informed by Mr. Giles Munby, that he saw an Ash tree near Dijon which overhung the road, so covered with *Canth. vesic.* that the ground beneath was actually blackened with their excrement. Passing beneath the tree, he felt his face as if bitten by gnats, and a sickening smell was perceived when at a considerable distance from it.

In a half putrid or decayed state, the wood of the Ash is a nidus for the two beetles, *Dorcas parellipipedus*, and *Sinodendron cylindricum*; the first we have not yet found in Northumberland, but the latter is abundant in the decayed wood of the Ash upon the banks of the Coquit. The bark, also, in a decaying state, or after the tree has been cut down a few months, becomes the nidus of the *Hylesinus fraxini*, a small beetle belonging to the family *Bostricidæ*, all the members of which are lignivorous. The subjoined cut represents the *Hylesinus frax.* of the natural size and magnified, also a piece of the decayed bark, show-

ing the galleries of the larva proceeding from the larger central one, on each side of which the eggs had been deposited by the female beetle.



The Ash is propagated by seed included in the sameras, or keys; these should be gathered in October or November, and afterwards mixed with sand or light earth, which should be frequently turned during winter, in order to decompose or rot away the outer covering. In February or March, after being cleansed from the sand and other matter, the seed should be sown in beds of tolerable soil, not too thick, else the young plants are apt to throw each other out of the ground. At the end of the year or following spring the seedlings may be run in nursery lines, from whence, in the course of two years, they will be fit to transplant to their permanent stations.

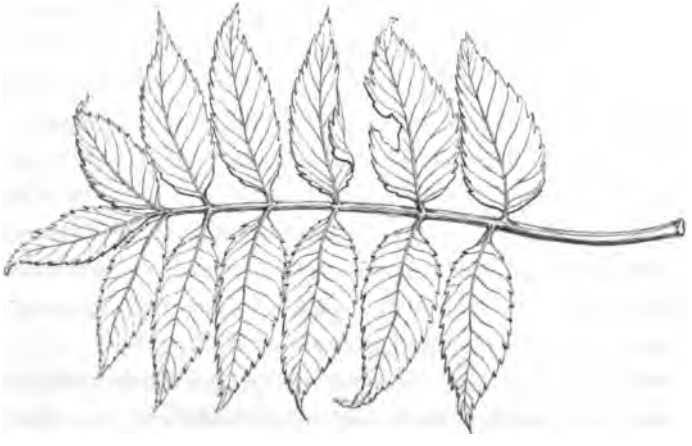
The pitting system should always be adopted in planting the Ash, for the roots, even in young plants, are too nu-

merous, large, and spreading, to be properly inserted by the slitting or T method.

From the nature of the seed or sameras, as well as the growth of the Ash, the species possesses a considerable power of occupancy, and where protected from the browsing of cattle, sheep, deer, &c., rapidly disseminates itself.

As an awning or covering to a seat or bower, the weeping variety *(Frax. ex. pendula)*, is well worth cultivating; this variety, as well as several others, is propagated by grafting upon stocks of the common kind.

Among the foreign species of fraxinus, the *Frax-Americana*, Michaux, appears to be one of the finest; but Loudon states that the young trees about London are generally more or less injured by the spring frosts. The *Frax. ornus*, *Flowering*, or *Manna Ash*, is perfectly hardy, but scarcely attains the dimensions of a timber tree.



Ulmaceæ.

Genus *Ulmus*, LINN. LINN. *Syst. Pentandria Digynia.*

THE ELM.

THE Elms are mostly trees of the first rank, attaining, in favourable situations, dimensions scarcely, if at all, inferior to the oak, the chesnut, the beech, or the ash; they live to a great age, and produce a hard and valuable timber; they grow with strong upright trunks, but these differ in their character, according to the habit of the species or variety to which they belong. In some the branches and head are generally subordinate to an elongated, conspicuous central trunk, as is seen in the usual growth and appearance of *Ulmus campestris*, and most of its varieties. In the *U. suberosa* and *U. montana*, on the contrary, the central column becomes lost or divided at a greater or less height, in the great diverging boughs or arms which form the head of the tree. The leaves, in all the species, are alternate, stalked, and unequal at the base, serrated, and generally rough or harsh to the touch; the axils of the primary nerves beneath are tufted with fine hairy filaments. The flowers expand earlier than the leaves, and are produced in copious tufts from the buds of the shoots of the previous year; their usual colour is a purplish red. The capsules or sameras are round or oval, more or less cloven on one side, very light and chaffy, and serve as wings to the central seed, which is often imperfect.

To the botanist and dendrologist the Elms have long proved a puzzling genus, and great doubt and uncertainty have always existed, as to what should be considered species, and what varieties. This difficulty we may trace to the fact, now well-known to cultivators, that the seed of the

elm does not all prove true to the tree from which it is gathered, but is apt to produce varieties, differing, more or less, from the parent plant; the consequence, therefore, of this propensity in the genus to vary in character and appearance, when originating from seed, renders the discrimination of species from varieties a matter of great uncertainty, and, except in cases where such varieties have been raised from seed collected and sown by the cultivator, as in the case of that known by the name of *U. c. viminalis*, and in that of *U. m. g. vegeta*, even the *species* or kinds from which varieties have proceeded must frequently be matter of conjecture.

Linnæus, it appears, referred all the Elms to *U. campestris;* but Sir. J. E. Smith enumerates five species of British Elms, viz. *U. campestris*, *U. suberosa*, *U. major*, *U. montana*, and *U. glabra*. Our own observations and the information we have been able to collect, incline us to adopt Mr. Loudon's opinion, and to consider the whole of the British Elms as referable to two species or types, of which the *U. campestris* is the one, and *U. montana* the other. The varieties and sub-varieties of the first are most of them distinguished by a smaller leaf, by their aptitude to throw up suckers from the roots, a provision which compensates for the frequently imperfect state of the seed they produce. The *U. montana* and its varieties, on the contrary, throw up no suckers, but produce an abundance of perfect seed. As doubts, however, must still exist on this subject, and as the fact, as to whether they are in reality species or varieties, is of little consequence to the cultivator, we shall consider some of the most distinct and marked of these Elms, and such as have usually been looked upon as species, under separate heads; the first is the *U. campestris*, Linn; English, or Small-leaved Elm.



Ulmus Campestris, Linn.

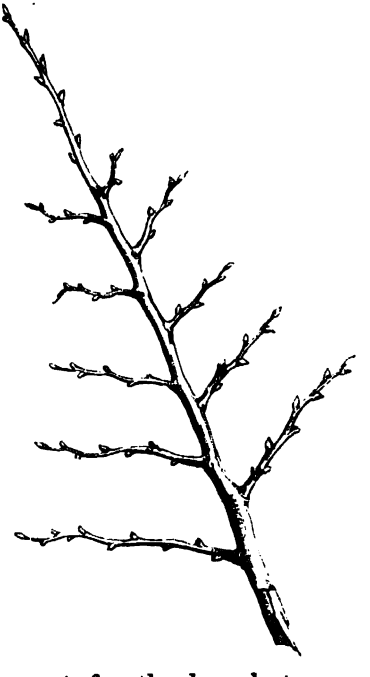
ENGLISH, OR SMALL-LEAVED ELM.

Ulmus campestris

Linn. sp. pl. 327.
Smith's Eng. Flor. v. ii. p. 20.
Hooker's B. Flor. ed. ii. p. 141.
Mackay's Fl. Hibern. p. i. p. 240.
Loudon's Arb. Brit. part iii. ch. ci. p. 1374.

The English, or Small-leaved Elm, which we here consider the typical form of the species, is seen in its greatest

perfection and beauty in the southern and midland parts of England, where it not only forms the avenues of the finest public walks and drives in the vicinity of towns and cities, and enters largely into the proportion of the trees which surround the residences and adorn the parks of our nobility and gentry, but is also the common and prevailing hedgerow timber in many districts, among which we need only to particularize the valleys of the Thames and the Severn. In this its finest form it shows a tall, spiring habit of growth, exhibiting a straight, continuous trunk, to which, throughout its entire length, the branches are subordinate. It grows rapidly, and often attains a height of from seventy to ninety feet, with a trunk of four or five feet in diameter, and this size it is said frequently to reach within a period of a hundred years. The spray of the species is light and slender, the shoots springing from the stem at an acute angle, and in an alternate manner, as shown in the figure. This mode of growth gives to the young branches a flat or fan-like form, which, however, becomes less apparent as the trees gain age, and as one year's shoot is added to another, till at length the weight of the spray becomes too great for the branch to support it at its original angle, and it is obliged to take



a declining, or more or less pendent form. The leaves are smaller than those of many of its varieties, with the exception of the *U. c. viminalis* and *U. c. betulæfolia;* they are doubly toothed or serrated, rough and harsh to the touch, of a dark green when matured, and slightly shining; like those of all the other Elms, they are unequal at the base, as shown in the figure, and broadest in the middle, tapering towards each end. The mid and cross ribs proceeding from it are prominent and strongly marked. The flowers, which appear before the leaves, are in tufts upon the shoots of the preceding year, and are of a purplish red colour; the samera, or seed capsule is oblong, deeply cleft on one side, and smooth. The seed is commonly imperfect, though trees of the species do occasionally mature it, and to this circumstance, and the self-sowing of these perfect seeds, we must attribute the origin of many of the varieties, or rather subvarieties, recorded in different districts in the south of England.



Whether the English Elm be indigenous to Britain, or was introduced from Italy in the time of the Romans, must remain a matter of conjecture, as we possess no record or evidence of so early a date, that enlightens us as to its origin. Its cultivation, however, from time immemorial, and the various localities in the south to which its name seems to have been attached in the times of the Anglo-Saxons, are, we think, proofs sufficient to confute and set aside the supposition of its having been brought from Palestine during the time of the crusades.

One circumstance that seems to favour an exotic rather than an indigenous origin, is, that in England it ripens and matures its seed less frequently and in less quantity than the continental *U. campestris* is said to do, though, even in France and adjoining countries a proportion only of the seed is matured, and, in Italy, we learn from Pliny's account and description of the Elm, that such was the case in ancient times.

It is distributed, in some of its forms or varieties, over a large portion of the middle and southern parts of Europe, as well as part of western Asia, and the north of Africa. In Italy it flourished in the time of its ancient classic authors, and continues to do so at the present day. In Rhenish Germany, Savoy, Switzerland, and a great part of France, the *U. campestris* is the common wayside tree of the country, though often seen varying more or less from what we are now considering as its typical form. A correspondent, to whom we are indebted for much valuable information respecting this genus and other forest trees, speaking of the Elm, in the districts we have mentioned, says, "It is a very large and fine tree, and its commonest aspect is something intermediate between our own English and Scotch Elms. Sometimes it so closely resembles the first as to be indistinguishable, and sometimes also as closely the latter; and yet, as if to claim its own Protean character, half a dozen trees will occur with tops like the English, and seed-bearing branches, below, equally like the Scotch; and again, a little farther, there will be others with the seminal foliage above, and barren branches, just like the English Elm, lower down."

In France, it does not appear to have been planted or cultivated as an ornamental tree till about 1540, though we are not to argue, from this circumstance, that its first

introduction only took place at that date. Evelyn also mentions that those which form the avenues at Madrid, the Escurial, Aranjuez, &c., were sent from England by Philip the Second, though we can scarcely suppose that the Elm was not to be found in some parts of Spain, antecedent to that period; but, probably, the English variety was sent over, as being a tree of finer form and more vigorous growth than the native kind. In England, as we have already stated, if not indigenous, it has, from time immemorial, been naturalized in all the southern and midland districts; north of the Trent, it becomes of rarer occurrence, though it is still found growing in great luxuriance and perfection at Doncaster, York, and other parts of Yorkshire; to the north of this line its introduction becomes apparent, and may be traced to a later and later period, the farther northwards we advance, by the comparative younger age, size, and rarity of the trees. In Scotland, according to Dr. Walker, the English Elm was scarcely known before the union of the two kingdoms; but, from the few examples recorded of the trees planted about that time, it appears to grow there with as great vigour as it does in England, as some are mentioned of seventy-five, ninety, and even one hundred feet in height, with diameters varying from four to six feet. In Ireland its introduction also appears to have been of a late date, as no instances of large trees are recorded, though it is now very generally dispersed throughout the island.

In point of magnitude, grandeur of form, and majestic growth, the English Elm has few competitors in the list of the British Sylva; it possesses, besides, great picturesque beauty, or those peculiar qualities which satisfy and delight all who are accustomed to look at nature and natural ob-

jects with the eye and feeling of an artist. In picturesque effect it was considered by Gilpin as only inferior to the oak, and inferior only in its skeleton or denuded state, for he says, "this defect, however, (alluding to the less distinct character of its ramification and spray,) appears chiefly in the skeleton of the Elm. In full foliage its character is better marked. No tree is better adapted to receive grand masses of light. In this respect it is superior to the oak and the ash."

The foliage of the Elm, though massive and thick, and affording an almost impenetrable shade, never appears heavy to the eye, like that of the horse-chesnut, or the sycamore; this is owing to the lightness of the spray, the comparative smallness of the leaves, and the loose, free manner in which they hang. The Elm possesses also the double advantage of coming into leaf with the early spring, and being among the very last of our forest trees to yield to the chilling effects of autumnal cold and frost, qualities of sufficient importance, independent of others it possesses, to render it one of the most desirable trees, where shelter, as well as ornament, is taken into account.

When first expanded, the leaves are of a pale though cheerful green, but, as the season advances, they acquire a deeper tint, and gradually become of a dark and slightly glossy green: this they retain till the autumnal cold has checked vegetation, when they gradually fade to a fine clear yellow, which, as Gilpin observes, "mixes kindly with the orange of the beech, the ochre of the oak, and many other fading hues of the wood."

As a park, or ornamental tree around the residences of our gentry, the Elm must always hold a distinguished place, possessing, as it does, all the qualities essential to give effect in such situations. It is also one of the most

appropriate trees, as well from its rapid and magnificent growth, as its patient endurance of the smoky atmosphere of towns, wherewith to plant or line public walks and promenades, witness the noble rows of the Elm in St. James's Park, Christ Church Meadow, Oxford, St. John's, Cambridge, and various other places in England; and, wherever the soil is not of too inferior a quality to bring it to maturity, it is one of the most eligible trees to cultivate in our hedgerows, producing not only shelter and amelioration of climate, and an addition to the beauty and appearance of the landscape, but also a supply of excellent, highly-useful timber.

If planted in masses, or to form groves, the young trees ought to be kept wide apart, as they require both room and air, to grow with that vigour necessary to produce the full developement of their appropriate form and character.

The difficulty of procuring sufficient plants in our nurseries, and their great comparative cost, would prevent us, if no other reason existed, from recommending it as an intermediate nurse, or secondary tree in mixed plantations, though, for this purpose, its upright and pyramidal growth renders it much better adapted than its relative the *Ulmus montana* (Scotch, or Wych Elm) which unfortunately (we believe in consequence of its rapid early growth) has been used to an extent fatally injurious to the trees it was meant to foster and protect, throughout the great extent of ground that has been planted in the northern districts of England and in Scotland within the last forty or fifty years. Other trees much better calculated for the office of nurses, as the Scotch Fir, Larch, &c., can be planted at a trifling cost, and the value of these as thinnings at the periods they ought to be removed, would greatly exceed that of the English Elm at a similar age.

In the south of England, the usual way of propagating the Elm, is by suckers, thrown up in plenty by the superficial roots, or by layers; the latter mode is esteemed preferable to the first, as layers are said to produce finer trees, and to grow with greater vigour and luxuriance than suckers. In the north of England and Scotland, it has been the common practice to propagate the English Elm by grafting it upon the *Ulmus montana;* this practice, however, though highly lauded and recommended by Sang, Hanbury, and other writers, we do not approve of, and to it we attribute, in a great measure, the frequent failure, or rather the stunted growth of the English Elm, where the attempt has been made to rear it as a hedge-row or single tree in our northern districts, and particularly where the soil is of a stiff or clayey nature; for the *Ulmus montana* is a tree that will only thrive upon good soil and never displays the magnificent form and dimensions it frequently attains, unless luxuriating in the deep and rich loam of alluvial deposits. It is therefore absolutely necessary, in order to ensure success where this stock is made use of, that the engrafted scion should be planted in a rich free soil.

The English Elm itself is not so fastidious or delicate; it will grow and thrive upon soils of an inferior description and of various characters, in those of a light as well as of a heavy quality, and frequently attains its largest dimensions, and acquires its best properties upon strong clayey loams, much too stiff and adhesive for the growth of the *U. montana.* We therefore recommend the layers and suckers of the best varieties of the English Elm, wherever they can be procured, to be planted in preference to those grafted upon a different stock, as this operation, we are convinced, is in no way necessary to the after develope-

ment of the trees, a fact sufficiently proved by the magnificent and rapid growth of the English Elm in England upon its own stock and roots; on the contrary, we are inclined to think that even under every advantage of soil and situation, the English Elm, grafted upon the *U. montana*, would never become so fine a tree, or attain the dimensions of an ungrafted plant.

The only circumstance under which grafting might prove advantageous, is where the soil is of an inferior, cold, and clayey nature, and where the Elm would not be likely to thrive upon its own stock; in this case we would recommend for a stock a tree much more nearly allied if not a variety of the species, and which grows and thrives upon very inferior land and strong clays; we allude to the oft-despised and neglected *U. suberosa*. Upon this stock, the English Elm, we believe, might be advantageously planted as a hedge-row tree, or in narrow belts of plantations in the cold clayey districts of the north of England and Scotland, where it would be in vain to try it upon the stock of *U. montana*.

No tree succeeds better when planted of a considerable age and size than the English Elm. In England, from the comparative coolness and moisture of the climate, this can be done without removing the side branches, or heading the plants, an operation they almost invariably undergo in France and other parts of the Continent, which makes them appear, for the first year or two, like mere stumps or truncheons stuck in the ground. The plants, however, under this treatment, grow rapidly and make fine trees; their eventual developement not being injuriously affected by it.

In the south of France, and near Paris, Loudon informs us that the *U. campestris* occasionally ripens seed, which

is sown by the nurserymen to procure new sorts, as well as by the managers of the National Forests, to obtain a large supply of plants at an inferior cost. When once planted, the English Elm rarely requires the pruning knife, though it will bear lopping to a greater extent than almost any other tree with which we are acquainted, as a convincing proof of which we need only instance the treatment it undergoes in many parts of England, where it is periodically divested of the whole of its side branches, and the naked stem left standing with a mere brush or besom-like head, to the great disfigurement of the country. We have hitherto been considering the English Elm rather in the light of an ornamental than a valuable timber tree; in the latter character, however, it is equally entitled to our regard, producing a material of excellent quality, and applicable to a great variety of purposes, both of land and sea carpentry. The wood when matured is of a deep brown colour, compact and fine grained; according to Loudon it loses nearly two thirds of its weight in drying, as when first cut it weighs nearly seventy pounds the cubic foot, and when seasoned not more than twenty-eight pounds and a half. In the lateral adhesion of its fibre it surpasses the *U. montana*, though perhaps inferior to it in longitudinal toughness, and therefore not capable of supporting so severe a cross strain. The former property, however, eminently qualifies it for every purpose where a strong wood that will not split or crack, either from concussion, or the action of sun and wet, is required; on this account, Matthew, in his able treatise on naval timber, strongly recommends it for the "blocks, dead eyes, and other wooden furniture of rigging." In country carpentry it is very extensively used in all the southern parts of England, but the purposes to which it is applied

it is unnecessary to enumerate, these having already been described by Evelyn and subsequent authors. Its durability under water, as well as the straightness and great length of its stem, qualifies it for making the keels of large ships, for which purpose it sells at a very high price. It was, also, before the general introduction of cast-iron pipes, almost exclusively used for the conveyance of water in all water-works in and about London and other towns; and as further uses to which it seems applicable from its durable qualities, may be suggested, the making of sleepers upon iron railways, where timber is selected for this purpose, and for the wooden pavement lately introduced, should it be found to succeed in the trials instituted in some of the crowded streets of the metropolis.

Upon the whole we consider that the English Elm has the advantage over the Scotch, or Wych Elm; for any inferiority in regard to longitudinal toughness in the first, is amply compensated by its greater lateral adhesion, its durability when exposed to weather, its superior size, greater length, and straightness of trunk.

The Elm is subject to the attack of several insects, among which the *Scolytus destructor*, a beetle belonging to the family *Bostricidæ*, Leach, was considered, some years ago, as by far the most formidable and destructive, as to its ravages in the larva state were attributed the decay and subsequent death of the finest Elms in the vicinity of London, particularly those in St. James' and Hyde Parks. Subsequent observations on the economy and habits of this insect have, however, shown that the *Scolytus* is not always, indeed perhaps but seldom, the proximate cause of decay, and that the trees are not attacked by the pregnant females for the purpose of depositing their eggs beneath the bark, until they have become injured

and diseased from some other cause, and which incipient decay renders the inner bark of the tree an appropriate food for the larva of the beetle. It is, however, the opinion of Mr. Spence, and other eminent entomologists, that when the *Scolyti* are very numerous, the perforations made by the perfect insects in healthy trees for the sake of food only, are apt to bring on that incipient decay or *carcinoma* which soon reduces the tree to a fit state for the reception of the eggs and larvæ. If such indeed be the case, we strongly recommend the preventive measures suggested by M. Audouin, the substance of which will be found in Loudon's "Arboretum Britannicum," where a figure of the insect, and other interesting particulars respecting its habits, are given. The foliage of the Elm is also often much injured, in some years completely destroyed, by the larvæ of another *coleopterous* insect belonging to the genus *Galleruca*, to which we may add the Elm flea, a pretty species of Haltica, which feeds upon the leaves in its perfect as well as in its larva state. Amongst its *lepidopterous* assailants are the *Porthesia chrysorrhœa* and occasionally the *Cossus ligniperda*, the Imago, Pupa, and caterpillar of which fine insect are already beautifully figured in the "Arboretum Britannicum." It is also sometimes subject to an ulcerous sort of disease produced by an extravasation of the sap or cambium, and causing the discharge of a thick sweetish fluid; for this no effective remedy has yet been discovered.

Among the varieties which, from their general aspect and habit, may safely be referred to the common Elm, the following are the principal that attain a timber-like size.

U. c. vulgaris, more irregular in its growth than the typical form, the branches are nearly horizontal in exposed

situations. This variety appears, unfortunately, to have been frequently substituted in the northern parts of England for the species. Its wood is of inferior quality.

U. c. alba of Masters, a valuable variety of a free and upright growth, the bark of the young shoots tinged with red, the leaves shining, doubly and deeply serrated. Timber good.

U. c. acutifolia, Masters, has a growth when young similar to that of the last; in old specimens the leaves are more tapering and the branches pendulous. Common in parts of Suffolk and Norfolk. Timber of good quality.

U. c. virens, Hort. Dict., commonly called the Kidbrook Elm, and nearly an evergreen. This is a fine ornamental tree, but rather delicate and tender in constitution, the young shoots being sometimes injured by frost in the vicinity of London.

U. c. Cornubiensis, *U. c. stricta* of Lindley. The Cornish Elm. A lofty tree, with a narrower head than the species, and with upright branches, and small coriaceous strongly-veined leaves. Later by a fortnight in coming into leaf than the common Elm. Loudon mentions specimens at Bagshot Park, seventy years planted, which are ninety feet high, with a diameter of trunk averaging three feet.

As ornamental or curious varieties, but valueless as timber, we have the *U. c. betulæfolia*, Birch-leaved Elm, the *U. c. foliis variegatis*, Silver, or Striped-leaved Elm, and the *U. c. viminalis*, a beautiful variety raised from the seed of the English Elm by Mr. Masters in 1817.

For the statistics of the Elm we must, for want of space, refer our readers to Loudon's "Arboretum Britannicum."



Ulmus Suberosa. AUCT.

CORK-BARKED ELM.

Ulmus suberosa

EHRH. Arb. 142.
SMITH's Eng. Flor. ii. p. 21.
HOOKER's Br. Flor. p. 141.
LINDLEY's Syn. p. 226.
LOUDON's Arb. Brit. ch. ci. p. 1395.

THOUGH most of our botanical authors consider the *U. suberosa* to be a distinct species, drawing their conclusion,

no doubt, from the difference of habit, form, and other peculiarities that it exhibits, as contrasted with the *U. campestris* described in the preceding pages, still we deem ourselves justified in withholding unqualified assent to this opinion, knowing the sportive nature of the seed of the Elm, and the varieties it is apt to produce, and are rather inclined to favour the opinion now entertained by many, that this tree is only one of the protean forms of the *U. campestris*, and from which it may be supposed it originally sprang. But however the fact may be, whether it actually represents a species, or is only a variety, is a circumstance that can only interest the botanist, and is of little or no consequence to the cultivator; we shall therefore leave our readers to determine with themselves the rank they choose to assign it.

Before proceeding with other matters connected with its culture, it may not be out of place to advert to the points of resemblance and difference, as contrasted with the *U. campestris;* and first in respect to its points of resemblance, we find that it possesses two essential qualities, common also to the *U. campestris*, viz., the free production of suckers from the roots, and the generally imperfect ripening of its seed, though flowers are produced in as great profusion as by *U. campestris*. The saplings also, for a few years, have the aspiring growth of *U. campestris*, though afterwards their developement is altered. The branches are always suberous, except upon the last year's wood, those of *U. campestris* frequently but not always so. From the *U. campestris* it differs in being two or three weeks later in coming into leaf, and its foliage is much larger. Instead of the upright, lofty, and compact form, with the continuous central stem of the *U. campestris*, it spreads like the *U. montana* into a few large diverging

limbs, which generally obliterate the central trunk; and the size of the tree, though large, rarely equals that of the English Elm. The timber, also, is always spongy, soft, and very inferior to the hard, compact, and durable wood of the *U. campestris*. It differs also in another point, and one of great importance to the planter, which is, that from some constitutional change it will thrive upon cold clayey inferior soils, where the *U. campestris* and *U. montana* could scarcely live.



The free production of suckers, and the corky bark of the *U. suberosa*, are sufficiently characteristic to prevent its being confounded with the *U. montana*, to which species, when arrived at maturity, it frequently bears a strong general resemblance in form and ramification. Its distribution, owing in all probability to its hardier constitution, and capability of adapting itself to soils of various qualities, is much more general than that of *U. campestris*. In the south of England it is found mixed with that tree upon the clay as well as the gravel, and grows well upon the Kentish chalks; in the midland counties it is equally common; again in the plain of York, it occurs in all kinds of soils, and further north and in Scotland, where it probably was first introduced for the *U. campestris*, it has become naturalized by means of its vigorous suckers. It also prevails along the coast of North Wales, and in the Isle of Anglesea, where it grows indifferently upon both limestone and slate. In Ireland it is met with on the

granite of Wicklow, and is abundant on the limestone of Kilkenny, Cork, Limerick, and Kerry; in all these different localities, it presents the same features, and though we believe it to have been originally introduced, is rapidly naturalizing and spreading itself by the suckers it throws up. It does not, however, appear to be equally prevalent upon the Continent, and the name of Dutch Elm sometimes given to it is anything but appropriate, the Elm of Holland being of a very different form and much more graceful appearance. We are informed, however, by a correspondent, to whom we are indebted for much valuable information upon this genus, that upon the hills of Montferrat, near Turin, he found an Elm with a very suberous bark, and in all respects like our British *Suberosa*; it forms extensive coppices in that district, mingling with and protecting saplings of the oak and ash.

It is, however, on account of its hardy constitution and power of occupancy upon inferior soils, that it chiefly merits attention; for in regard to form, beauty, and picturesque effect, though its claims to these are by no means inconsiderable, it is equalled if not surpassed by several of its tribe, and its inferiority as timber has already been noticed, though that, in poorly wooded districts, becomes of value, and is applicable to many country purposes. In cold and exposed tracts, where the soil is indifferent, the *U. suberosa* might be planted to advantage, not only as a nurse to other trees, but to form plantations or coppices of itself, which would always be kept thick and close at bottom by its sucker-bearing propensity; no want, it may be remarked, has proved so fatal to plantations formed on tracts of cold and inferior soil, as that of some vigorous reproductive plant that would shoot afresh without fail when cut over, or send forth

strong suckers to fill up vacancies as they might occur; this want is supplied upon inferior soils by the Cork-barked Elm, while in those of a better quality, the gean, or wild cherry, is admirably adapted for the same purpose. In mixed plantations, also, it might be advantageously introduced; thus in a combination of oak and Scotch fir where the latter are intended as first nurses to the oak, the Cork-barked Elm might be planted as secondary or after nurses, for which it is far better calculated than the wide-spreading *U. montana*, for when young and near to each other the growth of the *U. suberosa* is upright and aspiring, and bearing as it does the axe to any extent, is calculated to keep up a constant supply of protecting underwood. Again in strips of Scotch fir upon inferior soils, and where they are intended to form both nurses and principals, we could not do better than admit the *U. suberosa* very freely, especially along the margins of the strips, where they would struggle with the pines, and become a line of hardy, vivacious, reproductive secondaries to resist the wind, that would otherwise soon find a passage through the naked stems of the firs. It is also the best stock on which to graft the English Elm, where the soil is considered as not sufficiently good to bring that tree to perfection upon its own stock; the neglect of this precaution in the north of England, where instead of it, that of the *U. montana* has been made use of, has led to the generally stunted appearance which the *U. campestris* exhibits in all the poorer soils of that district, the nature of the *U. montana* requiring a richer soil to attain its proper dimensions, than the *U. campestris* itself. But as the *U. suberosa* shows a great deal of the general beauty of the genus, and its wood, though not of fine quality, is still useful, we would

also recommend it to be largely inserted in hedge-rows upon inferior soils and open districts, either in combination with the ash, or what might succeed better and be equally profitable, with the White tree Willow, *Salix alba*; we should thus not only improve the outline of a bleak and desolate-looking tract, but also procure a shelter that would materially tend to the amelioration of the climate.

The *U. suberosa* is easily propagated by its suckers, which it throws up in abundance, or even by truncheons which root pretty freely. Like the English Elm, it rarely matures its seed, but it is to its occasionally doing so that the following varieties are traced. 1st. *U. sub. alba* of Masters, a tree of more compact growth than the common *U. suberosa*, with pubescent shoots, and the bark much wrinkled and becoming white with age. 2nd. *U. sub. foliis variegatis*, with variegated or blotched leaves, in other respects similar to *U. suberosa*. 3rd. *U. sub. erecta*, a tall tree with a narrow head and corky bark, not unlike the Cornish Elm. The Broad-leaved and Narrow-leaved Hertfordshire Elms, are also supposed to be varieties of *U. suberosa*.

The *Ulmus major*, or Dutch Cork-barked Elm of Smith's "Eng. Flora," appears to be nearly related to the *U. suberosa*, but is a finer and more graceful-looking tree, with wide-spreading and drooping branches; the leaves are also larger and more bluntly serrated than those of *U. suberosa*, and are of a finer colour, and the bark even more corky than in that tree. In Holland fine specimens are to be seen upon the Boom-Key at Rotterdam, and various other places, and it appears that it was first introduced into this country by William the Third. Its cultivation, however, has long been given up, as it is found to produce timber of very little value, and inferior

to that of most other kinds of Elm. Loudon, in the "Arboretum Britannicum," informs us that the Elm trees in the old part of Kensington Gardens are of this kind, many of them are upwards of seventy feet high, and he remarks that of a number which have been blown down since 1816, all have been found rotten at heart. At Bolton, near Belfast, the seat of Sir R. Bateson, Bart., we observed several fine trees apparently of this variety, growing along the margin of the river. A reduced leaf from one of these trees is represented below.





Ulmus Montana. BAUH.

THE MOUNTAIN, WYCH OR SCOTCH ELM.

Ulmus montana.

BAUH. Pin. 427.
SMITH's Eng. Flor. ii. p. 22.
HOOKER's Br. Flor. p. 142.
LINDL. Syn. p. 227.
MACKAY's Flor. Hibern. p. 1. p. 241.
LOUDON's Arb. Brit. part III. ch. ci. p. 1398.

WHATEVER doubts may be entertained in regard to the origin, or first introduction of the *U. campestris* and its allied kinds, there can be none as to the indigenous

growth of the Wych Elm, which is allowed by all to be a native of the British Islands. In the southern parts of England it is less common than in the northern districts, and it becomes more abundant and more generally dispersed as we advance into Scotland, where it forms a prominent feature in the wooded scenery of that romantic and picturesque country; it delights in those deep glens and denes which are so common in its mountainous districts, for in these it finds a soil congenial to its nature, being generally rich and loose, and frequently mixed with the debris of rocks, through which the moisture percolates with ease, and at the bottom of these ravines there usually flows a stream whose brinks are enriched by deposition brought from above, and are well adapted to the constitution and long tough roots of this tree. It is also the native Elm of Ireland, where it flourishes in situations similar to those of the sister isles. Upon the Continent it appears to give place, at least in the champaign districts, to the *U. campestris* and its varieties, or else, as seems probable, it is there considered as another form of that species, being apparently unknown in France and Germany under the title of *U. montana;* this seems confirmed by Loudon's remark that the *Cevennes Elm*, considered a variety of *U. montana*, is a native of the south of France. It is, however, indigenous to the elevated forests of Switzerland, and we are informed of Germany also, under whatever name it may be known; and it is not improbable that the opinion of some botanists may be correct, viz., that the *U. campestris* of Linnæus refers to the *U. montana* of modern authors.

Instead of the upright pyramidal growth, and long continuous trunk of the *U. campestris*, the Wych Elm forms a large spreading tree, generally losing its central column

at no very great height from the ground, in the great diverging limbs which go to form its magnificent head. The branches, from their weight of foliage and rampant growth, usually take a drooping direction, and in fine old trees are almost pendulous, and hang in rich festoons.



The leaves are much larger than those of *U. campestris* or any of its allied kinds, being broadly elliptical, with a longer point and more deeply serrated; their upper surface is roughened with small hairy tubercles, the under surface downy, with the ribs hairy at their origin and subdivisions. The bark of the young shoots is downy, but the branches never become suberous or uneven. The flowers are on longish peduncles, and more loosely tufted than those of the *U. campestris;* they are of a purplish red colour, and give a rich aspect to the ramification of the tree, previous to the expansion of the leaves; and the samera is nearly orbicular, with a notch reaching about half-way to the seed.

Unlike the *U. campestris* and its group, the Wych Elm never throws up suckers from the roots, though a bunch of parasitical shoots are frequently seen issuing from the bottom of the stem; the want of suckers, as a mode of propagating itself, is, however, amply compensated by the abundance of perfect seed it produces.

In beauty of form, and not less in picturesque effect, the Wych Elm holds a distinguished place among our British forest trees, and though Gilpin allows it to be



generally more picturesque than the English Elm, we agree in the remark of his tasteful editor Sir T. Dick Lauder, that he has scarcely done justice to its merits. This omission or oversight, however, has been repaired by the latter in his appropriate comment upon Gilpin's text: "For our part," he observes, "we consider the Wych or Scottish Elm, as one of the most beautiful trees in our British sylva. The trunk is so bold and picturesque in form, covered, as it frequently is, with huge excrescences, the limbs and branches also are so free and graceful in their growth, and the foliage is so

rich, without being heavy or clumpy as a whole, and the head is generally so finely massed, and yet so well broken, as to render it one of the noblest of park trees, and, when it grows wildly amid the rocky scenery of its native Scotland, there is no tree which assumes so great or so pleasing a variety of character; our associations with it in such scenes lead us to prize it highly." To attain its full dimensions and characteristic form, the Wych Elm requires a deep rich soil, sufficiently damp, but not near to stagnant moisture; thus, it luxuriates in those deep alluvial soils, deposited in the valleys watered by our rivers, such as the various river dales of Yorkshire, where it may be seen in its finest forms among the rich inclosures skirting the river Tees, at Easby Abbey near Richmond in Yorkshire, and again in the haughs of the Teviot and Tweed, near Kelso, where noble and thriving examples are now rearing aloft their umbrageous heads, at the same time that the remains of the famed trysting tree, one of the largest Wych Elms on record, is still in existence. It is also from the loose texture and general good quality of the soil, through which moisture percolates with facility, that the deep dells and denes of Scotland and the north of England, become the appropriate habitat of this Elm, and in which it frequently exhibits itself in forms the most picturesque and beautiful, particularly in such as are of a rocky and precipitous character. On dry gravels and clays of almost every description it never thrives well or attains any considerable size, for, though it may grow for a few years after being planted with apparent luxuriance, it only does so as long as the surface soil remains unexhausted by its spongy wide-spreading roots, for it never fails to sicken and show unhealthy symptoms as soon as it touches the clayey substratum

beneath. The introduction of the Wych Elm to the great extent it has been carried, in all artificial mixed plantations in the north of England and Scotland, without regard to the nature of the soil or the peculiar habits of the tree, has been a great error and mistake; disappointment has in consequence followed, upon all soils of inferior quality, and, instead of a thriving crop of useful timber, the planter, after years of anxious expectation, beholds nothing but a set of hide-bound, unhealthy, and decaying trees. The rapid and rampant growth of this species for the first few years after planting, even in poor soils, and the value of its timber where it attains large scantling and maturity, were, no doubt, the inducements that led to this extensive cultivation, to which also may be added the further inducement held out to nurserymen to recommend it to their customers, as it was a plant they could raise in any quantity at a very trifling cost, and which returned a quick and ready profit, as the young trees were often fit to be removed from the nursery at the age of two years.

But the failure of the Wych Elm as a profitable tree upon the generality of soils appropriated to planting, is not the only or the least of the evils that have attended its almost unlimited introduction, for it has not only failed in itself, but has too frequently been the cause of preventing the growth and progress of other trees. The Wych Elm we consider from its habit and growth to be less calculated for mixed plantations than almost any other tree with which we are acquainted, not even excepting the ash, particularly where the oak, a tree that cannot bear close interference, is intended to form the principal or ultimate crop; for, in addition to the rapid growth we have noticed during its early years,

although upon soil in which it may never ultimately arrive at any respectable size, it has what Matthew, in his treatise upon naval timber, calls "a peculiar, fan-like, sloping-to-one-side spread of branch," giving it at all ages a wide-spreading head, which, rising above its slower growing neighbours, not only lashes them with severity, but deprives them of their due share of light and air, and soon suffocates or reduces them to a weak, unhealthy state, from which, extermination of their enemy by the free use of the axe is the only chance of recovering them. This we have learnt from experience, for in some extensive plantations, executed by contract or at so much per acre, about twenty-eight years ago, the Wych Elm was introduced to excess, and in these plantations the oaks and other trees have only been preserved and kept in healthy condition, by unremitting attention to the timely thinning out of their unruly neighbours.*

The only situations in which the Wych Elm can be planted in mass, or in numbers together, as a principal crop with a view to profit, appear to be rich banks, such as those of rivers, deep dells, &c., too steep for agricultural operations; for we hold that if land, such as this Elm requires to bring it to perfection, can be subjected to the plough, it would under cultivation pay the proprietor a much higher interest than any timber that could be grown. In such localities the Elms should be planted at distances of six or eight feet apart, otherwise they very soon interfere with and injure each other; a thin sprinkling of larch, pine, or birch might be introduced to vary the effect, and these would, at the periods

* Planters seem now to have discovered the error of introducing the Wych Elm so freely into mixed plantations, and by many it is interdicted; in consequence it is becoming comparatively scarce in the sale nurseries.

of thinning, soon repay the cost of planting, by furnishing a supply of posts, railing, &c.

As an ornamental tree in parks and lawns, where the soil is of good quality, it may be freely introduced, and in all rich districts it ought to constitute one of the principal hedgerow trees.

The Wych Elm produces timber of good sound quality, and applicable to a great variety of purposes in carpentry and wright-work, though upon the whole we consider it as inferior to that of the English Elm, as it neither possesses so much heart-wood, nor the lateral adhesion of that tree, in consequence of which deficiencies it is less fitted for purposes where a hard, tough wood that will not easily split, is required, such as the naves of wheels, blocks, &c. This opinion as to the comparative qualities of the timber of the two species is, we are aware, at variance with that of Sang and other Scottish writers, who state the wood of the *U. montana* to be superior to that of the *U. campestris;* but upon what ground their opinion of its superiority is founded they do not mention, and we are at a loss to conjecture, as from the rarity of the true *U. campestris* in Scotland and its inferior age, no proper comparative trials of their respective merits can have been made. We are, therefore, inclined to think that their estimate has been drawn from a comparison of the wood of the *U. montana* with that of the *U. suberosa*, (considered by them to be the English Elm,) which produces a soft, spongy wood, greatly inferior to most other trees of the genus.

Its elasticity, or toughness of longitudinal fibre, is, however, considerable, which qualifies it to be used as a substitute for the ash, when that wood cannot be procured; at the same time, it is less durable and decays much

sooner when exposed to weather or the alternation of wet and dry. By Matthew it is considered to be well adapted for the floor timbers and bottom-planking of vessels, though its quick decay above water renders it unfit for other parts in ship-building. It also frequently affords a beautiful material for the cabinet-maker, being subject, from some stoppage or peculiar diversion of the sap, either by the lopping of large branches or constitutional defect, to throw out large twiggy excrescences, which annually increase and deposit a curiously veined and marbled wood; these, when cut off and carefully seasoned, furnish a beautiful veneer for tables, work-boxes, &c. The woody fibre of such Elms, also, as have grown in a twisted form, presents a fine laced appearance or waved unevenness, and affords a rich plank for cabinet work.

The Wych Elm is propagated by seeds, which ripen every year, about the middle of June, in great profusion. They ought to be gathered by the hand from the tree, as, if allowed to fall, they are, from their lightness, soon dispersed and blown away. If sown immediately, a great portion of the seeds vegetate the same season, and the plants are fit to run into nursery rows the following spring, from whence they may be permanently transplanted after the year's growth. Though the Wych Elm does not produce suckers, it strikes from layers with great facility, and if a branch or twig by any accident touches the ground, it is sure to take root; from this facility of striking root, a close thicket of undergrowth may (as we have proved) very speedily and with very little trouble be produced, but unfortunately the shoots are unfit for many of those uses which render other underwood growths of considerable value.

It has been the custom in the north of England to graft

the English upon the stock of the Wych Elm: this we do not approve of, as it unfits it to be planted upon clayey or inferior soils, and we feel convinced that upon good soils the *U. campestris*, planted on its own stock, is much more likely to produce a fine tree than when grafted upon that of *U. montana*.

Among the varieties of the Wych Elm, Loudon enumerates seven which may be cultivated as timber trees, and which vary more or less in form and growth from each other. Of the curious or ornamental varieties, the Weeping Elm, *U. m. pendula*, and the *U. m. fastigiata*, are the two best worth cultivating. *U. m. vegeta*, called the Huntingdon or Chichester Elm, is placed by Loudon as a variety under the *U. glabra* of Smith's "Eng. Flor.," which latter species we are disposed to consider as itself a variety only of *U. montana*.





Ulmus Glabra. Auct.

THE SMOOTH-LEAVED WYCH ELM.

Ulmus glabra	Smith's Eng. Flor. ii. p. 23.
	Hooker's Br. Flor. p. 142.
	Lindl. Synop. p. 226.
	Mackay's Flor. Hibern. 241.
Ulmus mont. glabra	Loudon's Arb. Brit. ch. ci. p. 1403.
Ulmus montana B.	Flor. Br. 282.

The Smooth-leaved Elm, whether it be a distinct species, or only a variety of the *U. montana*, seems in a great measure confined to Essex and the adjoining counties,

as it is rarely met with in other districts of England. It is, to use Sir J. E. Smith's description, "a tall elegant tree, with spreading, rather drooping smooth blackish branches, scarcely downy in their earliest stage of growth." The leaves are of a firm rigid consistence, very smooth on both sides, having no hairs beneath except the axillary pubescence of the ribs; they are strongly serrated, much smaller than those of the *U. montana*, and of a more oblong form. The peduncles of the flowers are very short, and the samera, which is smaller than that of the *U. montana*, and of an obovate shape, is cloven down to the seed. It produces fertile seeds in abundance, and does not throw up suckers, two striking characteristics, strongly in favour of its having originated from the *U. montana*. We have introduced this Elm under a distinct head, in consequence of several fine varieties having been produced from its seed; some of these Loudon considers as approaching nearer to *U. montana* than their parent the *U. glabra;* others, he says, appear to partake of the character of the *U. campestris* and *U. suberosa*, a fact that would lead us to suppose some intermixture of the species had taken place; and he informs us that the late T. A. Knight Esq. raised plants from the seed of the Downton Elm, (a variety originally raised from the seed of *U. glabra*, in 1810,) which are so perfectly similar to the *U. suberosa*, and which approximate so nearly to the character of *U. glabra*, that "he (Mr. Knight) does not doubt but that the *U. campestris*, *U. suberosa*, and *U. glabra*, and three or four varieties which he has seen in different parts of England, are all varieties of the same species."



One of the finest of the varieties yet raised is the Huntingdon, or as some call it the Chichester Elm, the *U. m. vegeta* of the Hort. Soc. Garden. It appears, from a communication to Mr. Loudon, that this tree was raised near Huntingdon, not quite a century ago, from seed collected in that neighbourhood. It is one of the most rapid-growing trees of the genus, and its produce as timber is stated to be excellent. It is common about Buckden

in Huntingdonshire, where its peculiar growth and appearance is certain to attract the attention of the arboriculturist, and it has been mentioned to us as a striking variety under the name of the Buckden Elm. At Twizell, in Northumberland, it grows with great vigour, making yearly shoots of many feet in length upon soil of tolerable quality, and some that have been planted about twelve years are upwards of thirty feet high.

Its growth is upright, and not spreading like that of *U. montana*, and its leaves, which are pretty large, and of a fine cheerful green, are not only expanded before those of the Wych Elm, but what is of still greater consequence in a park or ornamental tree, are retained much later in autumn. It is propagated by grafts, which may be worked upon the Wych, or any other free-growing species of Elm, and also by layers. Another variety likely to be valuable is the Canterbury seedling, *U. g. major*, which equals the Huntingdon in quickness of growth, and has the same desirable property of retaining its leaves till late in autumn. It is much more spreading in growth, in which respect it approaches nearer to the *U. montana*.

The Scampston Elm, so called from a place in Yorkshire, is another variety, supposed by some to have originated from the *U. glabra;* other accounts mention it as originally brought from America. It is a tall, upright-growing tree, with a narrow head, in foliage and appearance partaking of both *U. glabra* and the Huntingdon Elm. It is seen in several parts of Yorkshire and in Nottinghamshire, particularly about Carlton on Trent, where there are many fine old specimens. It is a tree of very rapid growth, and generally when young makes annual shoots of several feet in length. Its timber, we are informed, is of very

inferior quality, and there are few trees of any age which are not decayed and rotten at heart.

There are several other named varieties of the Elms, but as they possess no particular claims to attention, we may be allowed to pass them over without further notice.





Nat. Ord. Juglandaceæ.

Genus *Juglans*, LINN. — LINN. *Syst. Monœcia Polyandria.*

Juglans Regia, LINN.

COMMON WALNUT.

Juglans regia — LINN. Hort. Cliff. p. 449.
WILL. sp. pl. iv. p. 455.
MICHAUX, N. Amer. Syl. i. p. 143.
LOUDON's Arb. Brit. ch. cii. p. 1423.

Nux juglans seu regia vulgaris. Bauh Pin. 417.

Previous to the introduction of the mahogany and other beautiful exotic woods, that of the Walnut was held in higher estimation than any other European tree, and supplied their place in the manufacture of the most valuable and costly pieces of furniture, examples of which are still occasionally to be seen in houses of ancient date, whose beauty in grain, polish, and pattern, would even bear a comparison with, and is scarcely surpassed by the elegant and fashionable furniture of the present day. In consequence of its superior properties as a cabinet and furniture wood, it appears formerly to have been cultivated and planted to a considerable extent, with a view to its timber alone; thus we find from Evelyn that in Surrey it was planted extensively near Leatherhead, also at Carshalton and at Godstone. It has never, however, been propagated either as a timber or as a fruit tree to the same extent in England as it has been in France and other parts of the Continent, where every possible encouragement from an early date has been bestowed upon its increase and cultivation. Burgundy, in Evelyn's day, abounded with Walnut trees, "where they stand in the midst of goodly wheat lands, at sixty and a hundred feet distance, and so far are they from hurting the crop, that they are looked upon as great preservers by keeping the ground warm, nor do the roots hinder the plough;" and he further adds, "that in several places betwixt Hanau and Frankfort in Germany no young farmer is permitted to marry a wife till he bring proof that he is a father of such a stated number of trees, and the law is inviolably observed to this day, for the extraordinary benefit the tree affords the inhabitants."

Another important application of Walnut timber, and for which it is peculiarly adapted on account of its strong

lateral adhesion, lightness, and little liability to split or warp in working, is the making of gun stocks. In England, till of late years, from the high price of the material, its use was almost restricted to the stocking of fowling-pieces, and other high-priced fire-arms, our muskets being stocked with beech or other woods of inferior value. During the last war, when most of the Continental ports were shut against us, Walnut timber rose to an enormous price, as we may collect from the fact of a single tree having been sold for 600*l.*, and as such prices offered temptations that few proprietors were able to resist, a great number of the finest Walnuts growing in England were sacrificed at that period to supply the trade. This deficiency of so necessary an article, the demand for which was daily increasing, led to the introduction of the timber of the American Walnut, which was found to possess similar properties, as well as to the importation of the wood of the Common Walnut from the coasts of the Black Sea, from whence it appears any quantity that may be required can at all times be obtained. This facility of procuring an unlimited supply has now done away with the inducement that previously existed, to plant the Walnut solely with a view to its timber, and its cultivation as such may be considered as nearly at an end; as a fruit-tree, however, it has of late years been rather upon the increase in England, in consequence of the introduction of improved varieties, which produce finer nuts, and at an earlier age than the common kind. In France, where the Walnut has long been used as a cabinet wood, as well as for other purposes, the consumption of it for musket stocks alone during the war period was enormous, as Loudon states that about 1806 no less than 12,000 trees were annually required for this purpose alone;

such an unusual consumption of a tree equally valuable and important to them for its fruit, led to measures to encourage and increase its cultivation, and in consequence prizes were awarded to those who planted it extensively, and nurseries were formed by the Government to raise young trees for transplantation.*

The timber of the Walnut is light, weighing when dried scarcely forty-seven pounds per cubic foot. When matured or converted into heart-wood, it acquires a fine brown colour, richly veined and shaded with black and lighter browns; it is solid and compact in texture but easy to work, and not liable to warp and twist; properties which render it applicable to particular purposes in cabinet-work, and to that use to which in England it is now chiefly devoted, viz., the making of stocks for fire arms.

It possesses great lateral adhesion, but the longitudinal fibre being short and brittle, it does not resist a severe cross strain, which renders it unfit for joists or main timbers. The finest veined and most beautiful samples are from trees that have grown upon dry and rather poor soils, the grain being closer and firmer in consequence of their slower growth as compared with trees planted in rich and deep soils. The roots also produce a most elegant material for fancy cabinet work, being cambleted and veined in a richer and more varied pattern than even the trunk.

When young the wood is yellowish-white and liable to be worm-eaten unless prepared by immersion in boiling Walnut oil, which prevents the attack of the insect, and it may then be used in contrast with the darker coloured wood.

* See Loudon's "Arboretum Britannicum," p. 1426.

The timber of the Walnut, however, does not constitute the chief value of the tree; such at least is the case upon the Continent, where the fruit is in great demand, and indeed becomes in many parts almost one of the necessaries of life, constituting not only a considerable portion of the food of the inhabitants of certain districts, but also affording an oil little inferior when first drawn to that of the olive, for which in many parts of France it is the substitute in all culinary matters; it is also a good lamp oil, and is very extensively used in the arts, being one of the most approved wherewith to mix up white and other delicate colours.

The nuts are used in different ways, and at various stages of their growth; when young and green and before the shell becomes indurated they make an excellent and well-known pickle, as well as a savoury ketchup, and a liqueur is also made from them in this state. Previous to their becoming fully ripe, and while the kernel is yet soft, they are eaten in France *en cerneaux*, a way of preparing them with a seasoning of salt, pepper, vinegar, and shalots. Towards the close of September or beginning of October they are fully ripe, and are then eaten in great quantities, being both wholesome and easy of digestion, so long as they remain fresh, and part freely from the skin which envelopes the kernel.

When used for the extraction of oil, the nuts are carefully dried, but not allowed to become rancid, and every precaution is taken, when breaking the shells, to keep the kernels uninjured and free from extraneous matter.*

From the roots, as well as the bark and leaves, a deep

* For an account of the mode of expressing the oil, and various other matters regarding the gathering, keeping, and general management of the fruit, we refer our readers to Loudon's history of this tree, in the "Arboretum Britannicum."

brown dye is obtained, which, in woollen articles, becomes fixed without a mordant, and, in parts of Asia, a sugar, as well as a wine, is made from the sap, when it first rises in spring. An infusion of the leaves, when poured upon the ground, brings the earthworms immediately to the surface, an expedient we have sometimes had recourse to, when desirous of obtaining bait for angling.

Persia, from whence also we derive the peach and apricot, is also the native country of the Walnut, a fact established by the elder Michaux, who found it indigenous in the province of Ghilan. From Persia it was, in all probability, first introduced into Europe by the Greeks, for we find it known to them by the name of Caryon, and its fruit by that of Persicon and Basilicon. Its introduction into Italy appears to have taken place at an early period, as allusions to certain customs connected with it are made by Horace, Virgil, and other Latin poets, and Strabo mentions the valuable properties of its timber, and the great price demanded for tables and other furniture made of its wood.

Of its first introduction into Britain we have no authentic information, though many suppose it to have taken place as early as the time of the Romans, and mention is made of it in the earliest botanical records. In the southern and midland parts of England, it attains its full developement, and generally brings its fruit to perfection; but, as we advance to the north, the ripening becomes less certain and depends upon the warmth of the season, and it is only in the finest and hottest summers that the nut is ripened in as high a latitude as Edinburgh, though the tree grows with vigour, and reaches in favourable situations a respectable size.

The form of the Walnut, when old and well-grown, is

imposing and at the same time picturesque. Its trunk, with its deeply furrowed, light-coloured bark, possessing that strength and massiveness of character necessary to support the thick and spreading limbs which form its lofty and, almost invariably, well-balanced head

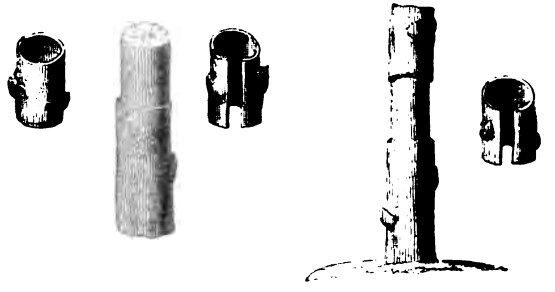
Its foliage, like that of most pinnate-leaved trees, is graceful and light, and its bright yellowish green contrasts well with trees of a darker shade. The principal, indeed, the only objection to it, is the short period it remains in leaf, the foliage not being expanded before the season is far advanced, and cast off with the first autumnal frosts; this deficiency is, however, in a degree, compensated by its ramification, which, as Gilpin observes, is generally beautiful.

The form and growth of the Walnut, which indicates great power and strength of resistance to the elements, and the enormous and deeply-penetrating roots it is provided with, evidently mark it as an unsocial tree, impatient of interference, and requiring ample room for its full developement. On this account it is ill-calculated for mixed plantations or close groves, but should be cultivated singly, or planted at distances of not less than thirty or forty feet apart. It is, therefore, well-adapted for a park tree, the hedgerow, and as a wayside tree, in which latter capacity it abounds in Switzerland, France, Germany, and other parts of the European continent.

The species is propagated by the nut, which, in cases where the tree is intended as an ornamental feature or for timber, had better be sown in the place where it is intended to remain, as the tap root, which in the young plant is very large, thus remains uninjured, and the plant escapes that check which must always, to a greater or less degree, attend the act of transplantation.*

* It may, however, with care and attention, be planted successfully, when of a considerable size.

The varieties, propagated chiefly for their fruit, are increased by budding, grafting, and sometimes by layering. These operations, in our climate, are uncertain and often fail, though this may probably arise from being performed either at an improper season, or without the necessary care and attention. Indeed, the success that the late T. A. Knight, Esq. had in grafting the Walnut* would lead us to think that such was generally the case, as out of twenty-eight instances of grafting, no less than twenty-two succeeded. In this experiment, both the scions and stocks of the last year's wood were employed, and these were allowed to unfold their buds and grow a few days before the operation took place; the saddle mode of grafting was that made use of. The most approved and successful mode of budding, and which is the one chiefly adopted upon the Continent, is that called the *flute* method, in performing which an entire ring of bark, containing one or more buds, is exactly fitted to the upper extremity



of the stock, which is also denuded of its bark; should the stock be larger than the ring containing the buds, the ring requires to be slit up, but, if this exceeds the stock, then a small portion requires to be cut out, so as to make it fit, as shown in the accompanying figures. Mr.

* See Horticultural Society's Transactions, ser. 2. vol. i. p. 216.

Knight, also, invariably succeeded in budding the Walnut, by using the minute buds that are found at the base of the annual shoots of this tree, and which, as he says, "are almost concealed in the bark, and which rarely, if ever, vegetate, but in the event of the destruction of the large prominent buds which occupy the middle and opposite ends of the annual wood." These he inserted on yearling stocks which grew in pots, whose vegetation had been retarded by being kept during the spring and early summer in a cold northern exposure, until the small buds above mentioned were formed on the current year's shoots of the trees intended to be propagated, when the pots containing the young plants were "brought into a forcing-house and there budded."

No tree requires less pruning, from its earliest age to its full developement, than the Walnut, and, except for the shortening of over rampant and ill-balanced branches, the knife ought never to be used; close pruning, or abscision by the stem, is invariably injurious, and we have repeatedly observed, when this has been done, that a decay, to a greater or less extent, always took place at the lower edge of the wound, in consequence of its slow cicatrization, and the spongy nature of the young wood.

The soil in which the Walnut luxuriates and attains its greatest dimensions is that of a deep, stiffish, dry-bottomed loam, but it thrives in various others, provided they are free from stagnant moisture. Loudon says "the fruit has the best flavour and produces most oil, when the trees grow on calcareous soils or among calcareous rocks."

In addition to the statistics of the Walnut contained in the "Arboretum Britannicum," we may mention one at Dunstan Hill, near Newcastle-on-Tyne, with a circum-

ference of trunk nine feet two inches, at one foot from the ground.

The specific characters of the Common Walnut are



leaflets from five to nine, but generally seven in a leaf, glabrous, obscurely serrated, and of an oval form. Nut oval and rather even.

The aments or male catkins, and female flowers appear in the south of England in April and May; in the north, rarely before the end of the latter month.

Few insects appear to feed upon the foliage of the Walnut; and, of lepidopterous larvæ, we have only detected that of *Biston betularius*, and of another small species of geometra, upon the trees in our premises.

The most approved varieties, for their fruit, appear to be the following:—

Jug. r. maxima, with fruit double the size of that of the species. The nuts ought to be eaten in a fresh state, as the kernels shrink up to half their size, when dried. The leaves of this kind are very large, and the tree is highly ornamental, but its timber is inferior to that of the Common Walnut.

Jug. r. serotina. Where frosts continue late in spring this is a valuable kind, as it does not come into leaf before the end of June, and yet the fruit ripens nearly as early as that of the other varieties.

Jug. r. tenera, Thin-shelled Walnut. The nuts of this variety have a very thin, tender shell, are fine flavoured, keep longer, and produce more oil than any other kind; but the trees are generally less prolific. The names of several other less approved varieties may be obtained from the *Bon Jardinier* and the fruit catalogue of the Horticultural Society.

None of the American Walnuts, or hickory trees, have been long enough introduced, or planted to such an extent in England, as to entitle them to a place in the present work. Most of them produce valuable timber, particularly the *Juglans nigra*, American Walnut, a considerable quantity of which is now imported into Britain.

Nat. Ord. Salicaceæ.

Genus *Salix*, LINN. LINN. *Syst. Diœcia Diandria.*

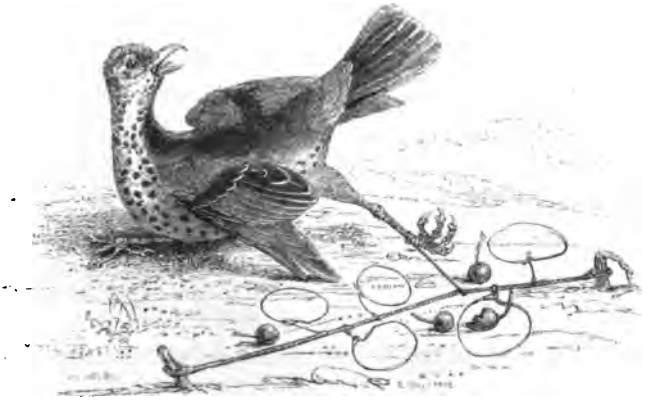
THE WILLOW.

OF this very extensive, and, to the botanist, difficult and puzzling genus, the only British species admissible into the present work, being such as attain the size of trees of the first and second ranks, and produce valuable timber, appear to be the four following:—1st. *Salix fragilis*, Crack, or Red wood Willow; 2nd. *Salix Russelliana*, Duke of Bedford's Willow; 3rd. *Sal. alba*, White-tree, or Huntingdon Willow; and, 4th., *Sal. caprea*, the Goat-Willow, or Saugh. The two first of these belong to Borrer's 5th group, or *Fragiles*, as exemplified in Loudon's "Arboretum Britannicum;" the third to the 6th group, or *Albæ*, of Borrer; and the fourth to the 16th group, *Cinereæ*, of the same author. We might perhaps be justified in adding that beautiful exotic species, introduced, it is supposed, upwards of a century ago, the *Salix Babylonica*, Weeping Willow, which, under favourable circumstances, in the southern and midland parts of England, attains a considerable size, or that of a tree of the second magnitude; but, as it is only cultivated for its ornamental and classic effect in landscape and picturesque gardening, and not for its timber, which is valueless, we have omitted it in our list. Of the other British species, amounting, according

to some botanical authors, to nearly seventy, while others reduce them to about thirty, a few, when trained and attended to in their growth, reach the size of small trees of from twenty to thirty feet high; such are *Sal. triandra*, *Sal. pentandra*, *Sal. acutifolia*, *&c.;* the majority, however, are of humble growth, and under the name of osiers are valuable when cultivated, producing the material used in the fabrication of all kinds of basket and wicker-work.*

The generic characters are, flowers of each sex with entire bracteas. Male flower generally consisting of 1—5 stamens, sometimes more, with one or more glands inserted contiguously to the stamens. Female flower, a pistil stalked, or sessile with one or more glands inserted contiguously to it. Leaves in most species, with the disk more or less lanceolate.

* For further information respecting this interesting genus, the uses to which the species are applied, their culture, &c., we must refer our readers to the "Arboretum Britannicum," where they will find a comprehensive digest of all that has been written upon the subject.





Salix fragilis. LINN.

THE CRACK, OR RED-WOOD WILLOW.

Salix fragilis,

LINN. sp. pl. 1448.
SMITH's Eng. Flor. 4. p. 185.
HOOKER's Brit. Flo. p. 421. ed. III.
MACKAY's Flo. Hibern. p. 246.

ON referring to the botanical and arboricultural writers who have treated of this tree, we find a remarkable discrepancy of opinion existing among them, as to the quality

and properties of its timber. By Sir J. E. Smith, in the "English Flora," its wood is stated to be of little value, and that whatever economical or medical uses have been attributed to it, belong to another species (*S. Russelliana*). On the other hand, Mr. Matthew, in his able treatise on naval timber, asserts its excellence and the valuable properties it possesses for this specific and important purpose: "the use (he says,) of the Red-wood Willow as timbers of vessels has been of long standing in this part of Scotland,* and has proved its endurance and excellent adaptation;" and, he further adds, "by reason of its lightness, pliancy, elasticity, and toughness, it is, we think, the best without exception for the formation of small, fast-sailing war vessels." This high estimate of the wood of the *Salix fragilis*, coming as it does from one who has seen its properties tested and had experience of its value, outweighs, in our opinion, that of the scientific botanist, who probably had never personally examined, or made trial of its qualities, but had taken, without further inquiry and as correct, the common opinion entertained in many parts of its worthlessness, the despised withy having generally been left to rot where it grew, without an attempt to ascertain its properties, or, as a timber, to convert it to any useful purpose. Important as it may be in a naval point of view, its timber is not less useful in various other ways; from the author already quoted we learn that, for the main timbers or roofing of houses, it furnishes a very durable material; those of a house he mentions formed of it, and which had stood for upwards of a century, were found, with the exception of the outside to the depth of scarcely half-an-inch, perfectly sound, "still fit for any purpose, of a beautiful pink or salmon colour." It is also

* The eastern coast of Perthshire and Bannffshire.

valuable for the repairing of mill wheels, forming excellent wash boards. It also furnishes as good a plank for the lining and bottoms of stone carts, as any other tree of the Willow or Poplar kind; and for all country uses, where a tough, strong, and, at the same time, a light material is required, cannot be surpassed, and we believe, from its grain and colour, it would make very handsome, light, and durable furniture.

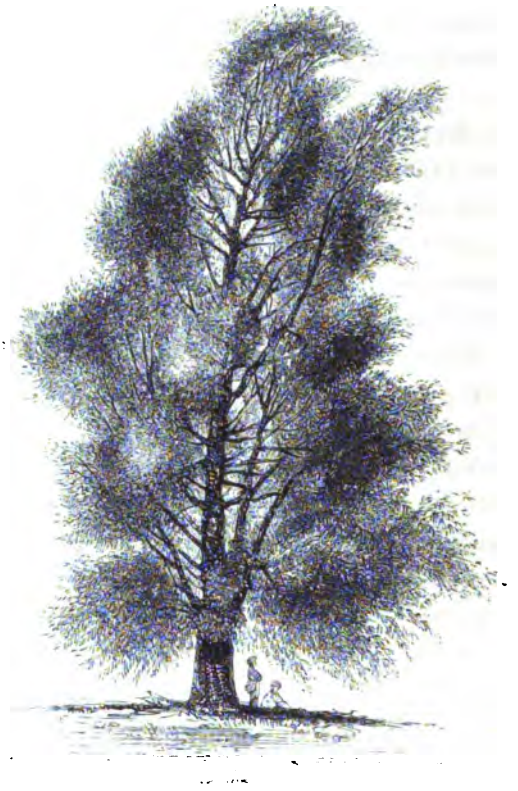
This Willow is found distributed throughout the greater part of Britain, but more prevalent in some parts than others. It flourishes upon the banks of rivers, canals, and ditches, and seems to affect a soil rather stiff than otherwise, and we have seen it attain a very considerable size upon cold, damp, clayey soils. On this account we recommend it, if wanted for its timber, to be planted as a hedge-row tree, and also in belts and plantations in upland districts, where the soil is stiff and of moderate quality, as it is likely with some of its congeners to become valuable, both for the shelter and timber it affords, long before the ash, elm, or any other of the slower-growing trees would attain the size of ordinary poles. In its foliage it bears a strong resemblance to the *Sal. Russelliana*, but its growth is different, the ramification being more oblique and the branches in consequence rather crossing each other. It is also less beautiful and imposing in appearance, and seldom attains so great a size. It is very subject to become naked or stag-headed, by the decease of its uppermost branches, though it continues to live, and throw out long annual shoots for many years afterwards; this renders it unsightly, and, as an ornamental species, very inferior to the *Sal. Russelliana*, or the *Sal. alba*. The cause of this canker, analogous apparently to that which attacks so many of our apple and pear trees, has not been satis-

factorily ascertained, and it is still a matter of conjecture whether it is to be attributed to the soil, or to an inherent taint in the slips or cuttings by which it is usually propagated.

When first cut the sap wood of the Crack Willow is white, the heart pale red; upon exposure to the air, and when seasoned, both become of a fine salmon colour. The bark is bitter and contains a large proportion of tannin, as well as a bitter principle termed salacine, akin in its properties to quinine. The roots afford a purple red dye, and are still used in Sweden and in France to colour the Paschal or Easter eggs, a use to which they were also formerly applied in Scotland.

The larvæ of several nocturnal lepidoptera feed upon the leaves of this as well as other willows; among them we have found those of *Cerura vinula*, *Notodonta ziczac*, and *Smerinthus populi*.





Salix Russelliana. SMITH.

RUSSELL, OR DUKE OF BEDFORD'S WILLOW.

Salix Russelliana,
SMITH'S Flo. Brit. 1045. Id. Eng. Flor. v. 4. p. 186.
FORBES in Sal. Wob. No. 28.
HOOKER'S Br. Flo. p. 421. ed. III.
MACKAY'S Flor. Hibern. p. 246.
LOUDON'S Arb. Brit. ch. ciii. p. 1517.

THE specific characters of this Willow, as given by botanical authors, are as follows. Leaves lanceolate, tapering at each end, serrated throughout, and very glabrous.



Footstalks glandular or leafy. Ovary tapering, stalked, longer than the bracteas. Style as long as the stigma.

The male, according to Dr. Johnston, has the catkins two inches long, on short leafy branchlets, cylindrical, yellow, diandrous, the filaments not much longer than the pointed, more or less villose scales.

With a foliage considerably resembling that of *Sal. fragilis*, but lighter and more airy in appearance, the Bedford Willow exhibits, when fully grown, a much freer and finer outline, in consequence of the different or more obtuse angle at which its branches issue from the stem. It is a tree of very rapid growth, nearly equalling in that respect the *Sal. alba*, and attains in favourable soils a size superior to that of *Sal. fragilis*. Of the specimens mentioned by authors, the favourite tree of Dr. Johnson, belonging to this species and growing near Lichfield, appears to have been one of the largest, and in 1812, a few months previous to the first injuries it received from the elements, its dimensions were as follow: girth at six feet from the ground twenty-one feet, the length of the stem below the ramification which formed the enormous head, twenty feet; three years afterwards it had lost the greater part of its boughs, and in 1829 it was blown down by a violent storm, which took place on the 29th of the April of that year. We lately measured a tree of this species growing at Dunstan Hill, near Newcastle-on-Tyne, ten feet in circumference at the base; but the length of the stem is not more than eight feet, at which height three or four

enormous limbs branch out and form a lofty and wide-extended head.

The Bedford Willow appears formerly to have been confounded with the *Sal. fragilis*, or considered as a variety of that species, and it was not till the commencement of the present century that its distinctive characters were pointed out, and the appropriate name of *Russelliana* given to it, the late Francis, Duke of Bedford having been the first to bring it into notice, and point out the valuable properties it possesses as a timber tree.

The wood of the Bedford Willow is of a quality fully equal to that of *Sal. alba*, being tough, elastic, and durable, though perhaps not more so than that of *Sal. fragilis*, which species, however, it generally exceeds in scantling, when grown together upon ground of the same quality. It forms strong and durable joists and main timbers for buildings, and makes an excellent flooring for manufactories, &c., not splitting by any sudden shock, and, like the wood of the poplars, being of slow combustion and difficult to set on fire. Its tough and strong lateral adhesion makes it an excellent lining for stone carts and barrows, and, in the neighbourhood of stone and lime quarries, we have known the wood of this and the White Willow to sell at as high a price as five shillings per cubic foot.

It thrives and attains its greatest developement in a moist soil of good quality, but not where water is stagnant. It also produces good timber and of a tolerable scantling upon inferior and clayey soils, and is by no means of a tender or delicate constitution. It is, therefore, a profitable tree to plant upon exposed uplands in company with *Sal. alba*, *Sal. fragilis*, and other trees, and we strongly recommend it as certain to make a speedy and

profitable return to the planter. When grown in company, or planted in mass, the side branches are kept small, and do not interfere with the growth of the main stem of the tree; it therefore runs up to a great height, with a clean straight trunk, and is thus rendered fit for many purposes to which, when grown as a single or hedgerow tree, it is seldom applicable. At Twizell, about sixteen years planted, it is upwards of forty feet high, with a straight stem, measuring three feet ten inches in circumference at one foot from the ground. At Tallowden, the seat of General Sir H. Grey, there are some fine examples of this tree, averaging upwards of sixty feet in height, and about eight feet in girth.

From experiments that have been instituted, it appears that the bark of the Bedford Willow contains, in a given quantity, a greater proportion of tannin than that of the oak; this ought to render it as valuable to the tanner as the bark of that tree, but we do not find that it is much sought after or in demand, at least such is the case in the north of England. This, however, may arise from its superiority not being generally known to the trade, though we apprehend that a mistaken prejudice, and an unwillingness to make trial of a new material, (however good it may be,) because it is new, may have their effect in preventing its general application. Most of the insects and larvæ which feed upon the *Sal. alba* are also found upon this tree.



Salix alba. LINN.

WHITE, OR COMMON HUNTINGDON WILLOW.

Salix alba,

LINN. sp. pl. 1449.
SMITH's Eng. Bot. 1230. Id. Eng. Flo. v. 4. p. 231.
FORBES in Sal. Wob. No. 136.
HOOKER's Brit. Flo. ed. III.
MACKAY's Flo. Hibern. p. I. p. 247.
LOUDON's Arb. Brit. ch. ciii. p. 1522.

IN this species the leaves are lanceolate, serrated, the lower serratures bearing glandules, both sides covered with adpressed silky hairs, giving the foliage a whitish appear-

ance. Stamens hairy, two to a flower, the ovary glabrous, flowers loosely disposed in the catkin. This species, which may justly be considered the finest, and perhaps the most elegant of the tree Willows, grows naturally to a very great size, with an outline, very frequently, of imposing elegance and picturesque effect, and which, as Gilpin observes, fits it to appear in any rural scene. Such is its effect where it is left to its free growth, and where the disfiguring custom of pollarding, so common in the fenny parts of England, is either unknown or rarely practised. In the north of England and Scotland, where mineral fuel is cheap and plentiful, and no necessity exists for the trimming and pollarding system, very fine examples of this tree are often met with, and, when growing in an appropriate situation, such as on the banks of a river, the margin of a purling brook, or in one of our low, sheltered, and sunny haughs, it forms a beautiful and interesting feature, its silvery and plume-like foliage giving an air of lightness and grace to the landscape, and producing, by its contrast with foliage of a deeper tint, that effect so agreeable to those who view such scenes with the eye and feeling of an artist.



Hitherto the *Sal. alba* as well as the *Sal. Russelliana* do not appear to have been cultivated to the extent they so well deserve, considering the value of their produce, and that they make a more rapid and profitable return to the

planter than almost any other tree, the larch always excepted.



The White Willow has also the advantage of thriving, and growing to a large size, upon land of secondary quality, though it no doubt attains its finest developement in a rich moist soil. We have seen it, indeed we have many promising young trees growing rapidly upon a stiffish clay, where it has been well drained of stagnant water. It is therefore well calculated for plantations in poorish upland districts, and we would recommend it, together with the *S. Russelliana*, to be freely inserted where such are made, particularly in hollows near water-courses, or at the bottom of declivities where the soil is moist: thus planted, in company with other trees, or in masses by itself, the Willow makes astonishing progress, and soon reaches a

great height, with a clean straight stem, rendering it fit for a great variety of purposes where length of solid timber or planking is required. Its growth is very rapid, the annual increase of timber in trees of between twenty and thirty years old, having been found to be at the rate of one cubic foot and a half; such appears to be the result of the measurement of five trees at Woburn Abbey, the particulars of which are detailed in the "Arboretum Britannicum," and we find that a similar increase took place in willows of this species planted by Mr. Gorrie on the northern bank of the carse of Gowry in Perthshire. At Twizell, in Northumberland, upon soil of moderate quality, being a stiffish loam, its growth has been equally rapid, and we have just measured a tree planted about eighteen years ago, whose height is upwards of fifty feet, with a trunk six feet four inches in circumference at two feet from the ground; others growing near to this individual are loftier, but none of them equal it in girth, the two next being, the one five feet four inches, the other four feet six inches in circumference.

The simple, and at the same time the very cheap mode of propagating the Willow is also another great advantage attending its cultivation, for all that is required to form a plantation is to take cuttings of wood one or two years old from a foot to two or more in length, and plunge them to the depth of eight or ten inches into the soil; stakes also of a larger size, or from six to eight feet long, and from two to three inches in diameter, succeed very well, and are recommended by Mr. Gorrie; but having tried both methods, we prefer the smaller cuttings, and think our finest trees are from these.

As a hedge-row tree the White Willow succeeds very well in low and sheltered districts, attaining a great size,

and presenting the appearance of a wide-spreading tree, the stem seldom reaching to any great height before it divaricates, and throws out great limbs which form the head. In exposed and upland situations it is unable, when planted singly, to resist the force of the prevailing winds, and in consequence generally deviates more or less from the perpendicular, and is liable, in heavy storms of wind, to have its limbs broken or torn from the stem.

The wood of the *Salix alba* is similar in texture and quality to that of *Russelliana*, and adapted for like purposes, making excellent sheathing for stone carts, barrows, &c., and when grown in mass, or in company with other trees, affords clean and durable joists and rafters for buildings; it is also used in mill-work, and by the turner and cooper. At a younger age, or as a coppice wood, it produces hoops, light handles for hay-rakes, hoes, and other implements, and the twigs are used in basket-making and other wicker-work. Willow-wood is also used when split into fine lamina, to weave or work into light hats and bonnets, and the woven material is the foundation upon which the light silk hats, now so generally in use, are moulded.

Its bark contains a large portion of tannin, but is not in great demand or appreciated by the tanner as it would seem to deserve, nor is it used to nearly the same extent in England as it is in other parts of the north of Europe.

In Sweden, and other high latitudes, where the seasons are uncertain, and scarcity is often felt, in consequence of the failure or imperfect ripening of the corn crops, the inner bark of this species, as well as that of the Scotch fir *(Pinus sylvestris)*, is frequently made into a bread, being first dried, then ground into a fine flour, and mixed with a certain proportion of oatmeal. Loudon informs

us that in France "a fine blood-red colour is obtained from the bark which is also used in the preparation of leather for making gloves."

The species is widely spread throughout Europe, possessing a range from Norway to the Mediterranean, and is also a native of the north, east, and west, of Asia.

The foliage of the Willows, and among the rest that of the present species, is the food of the larvæ of numerous lepidopterous, coleopterous, and hymenopterous insects; among those of the Lepidoptera we have observed most of the following, *Smerinthus populi*, and *ocellatus*, *Clostera reclusa*, and *curtula*, *Cerura furcula*, *arcuata*, and *vinula*, *Notodonta ziczac*, *Leiocampa dictæa*, *Leucoma salicis*, *Orthosia sparsa*, and *lota*, *Calyptra libatrix*, *Bombycia viminalis*, *Zanthia aurago*, *Cabera pusaria*, *Cidaria salicata*, &c. The ravages of some larvæ are not, however, confined to the leaves, for the wood itself is bored into and fed upon by the caterpillar of the Goat Moth, *(Cossus ligniperda)*, and we have had young trees attacked and *riddled*, as it were, by the grub of the *Cryptorynchus lapathi*, a coleopterous insect belonging to the Curculionidæ or Weevil tribe, and whose habits and depredations are noticed and accurately described by Mr. W. Curtis, in the 1st. vol. of "The Linnean Society's Transactions." At the period of flowering, Willow trees swarm with hosts of honey-bees, and other species belonging to that family, among which the party-coloured and sonorous humble-bees are eminently conspicuous; and when in full foliage they become, from the abundance of insect food they afford, the favourite resort of several of our insectivorous warblers, such as the black-cap *(Curruca atricapilla)*, greater pettychaps *(Curruca hortensis)*, and those delicate species of the genus Sylvia, commonly known by

the name of Willow-wrens; at the same time may be seen the various species of our own native titmice, engaged in eager and prying search, and hanging from the tender spray in every possible attitude. The vignette represents the imago, pupa, and caterpillar of *Smerinthus populi*.





Salix caprea. LINN.

GOAT WILLOW, OR LARGE-LEAVED SALLOW.

Salix caprea,

LINN. sp. pl. 1448.
SMITH's Eng. Bot. 1488. Id. Eng. Flor. iv. p. 225.
FORBES in Sal. Wob. No. cxxii.
HOOKER's Br. Flor. p. 429. ed. III.
MACKAY's Flor. Hibern part I. p. 252.
LOUDON's Arb. Brit. ch. ciii. p. 1561.

THE present species, in some districts known by the name of the Saugh, is distinguished from all the other Willows by its large ovate, or sometimes orbicular ovate leaves, which are pointed, serrated, and waved on the

margin, beneath they are of a pale glaucous colour, and clothed with down, but dark green above. The stipules are crescent-shaped. The catkins are oval, very numerous, nearly sessile, and are expanded much earlier than the foliage. The ovary is stalked, silky, and ovate in form; the stigmas are undivided and nearly sessile.



The Goat Willow or Saugh, though barely reaching, even under favourable circumstances, the dimensions of a



tree of the second rank, is yet, we think, from the several valuable properties it possesses, of sufficient importance to be admitted within the limits of the present work. In favourable situations, and unmolested in its growth, it

attains a height of from thirty to forty feet, with a trunk from a foot to a foot and a half in diameter. It seldom, however, possesses any considerable length of clean stem, as the branches which form the head, generally begin to divide at a moderate height, and, diverging in different directions, give it the bearing and appearance of a compact, round-headed tree.



The foliage, unless seen directly from above, (when it appears entirely of a deep green,) has, from the mixture of the whitish under surface of the leaves with the deeper green of the upper, a dull glaucous appearance, which we have seen produce a good effect in certain situations and in contrast with the foliage of a different and livelier hue.



It grows in almost all soils and situations, but prefers dry loams, and in such attains its greatest size; and as the female plants are numerous and produce abundance of perfect seed, it propagates itself very extensively throughout the whole of Britain. Our associations as connected with this tree, are all of a pleasing description; it reminds

us, at an early period of the year, when its pure white silky catkins first burst the cerements that enshroud them, that the severity of winter is fast passing away and a milder season approaching. It is also a little later, when those catkins we lately admired for their silvery lustre are now glowing with a golden inflorescence, that we first hear and listen, with pleasurable feelings, beneath its richly-clothed head, to the busy hum of the honey-bee, and to that of its larger and more sonorous relative, the humble-bee, whose resuscitation from a long torpidity we have always been accustomed to hail as a certain indication of the commencement of spring and of a mild and genial temperature.

The wood of the Saugh is of a pinkish white colour, with a fine smooth grain; and, possessing considerable lateral as well as longitudinal adhesion, is tough and elastic. These properties render it applicable and well adapted to various purposes where small-sized wood only is required; thus, it makes good handles for hatchets and other tools, rake-teeth, &c. It also makes light and durable hurdles, which long resist the alternation of moisture and dryness. It is subject, however, to have the lower part of the stem much injured by the galleries or perforations of the larva of the *Trochilium crabroniforme*, (Lunar Hornet Sphinx,) a beautiful lepidopterous insect belonging to the family *Trochilidæ*. Few trees of this species,—to which it seems confined,—escape the ravages of this insect, and out of a great number of trees cut down at various times we scarcely recollect a single instance where the plant had attained a diameter of two or three inches, that had not been perforated by the *Trochilium*. In its perfect state it is rarely met with at large, and most of the specimens we possess have been

obtained from trees that had been cut down, and which were observed to contain the larva or the pupa of the insect. Such pieces as were found to contain these were kept in a large box placed in a dampish situation, and carefully watched till the developement of the perfect insect, which takes place towards the end of June or beginning of July. The following plan has also been adopted with success; this is to surround the lower part of the trunk of growing trees containing the pupa with fine muslin or leno, taking care so to secure the lower and upper ends, that the perfect insects when they come forth cannot escape between the muslin and the bark.

Trees infested with the larvæ are easily detected by the sawdust or abraded wood which is found at the bottom of the trunk, just where it emerges from the ground, and where the larva appears to make its first entrance, which some entomologists suppose is not till the second year of its own age, as the caterpillars and the perforations are all large and nearly of the same size, nor are any borings met with indicative of a small or newly-hatched worm; the supposition, therefore, is, that the caterpillar is hatched about the root of the tree, and for a certain period lives upon the tender bark of the roots, a fact, however, that we have not yet been able satisfactorily to ascertain.

Galleruca caprea, a beetle belonging to the family *Gallerucidæ*, also infests this as well as *Sal. cinerea*, both in its perfect and larva state; and the leaves are also often much injured by the caterpillars of *Nematus caprea*, a four-winged insect belonging to the *Tenthredinidæ*.

The bark of *Sal. caprea* contains a considerable proportion of tannin, and brings the same price as that of the birch and larch, in the north of England and Scotland.

It grows very rapidly for a few years, springing from the

seed, and trees when cut down, often throw up from the stock shoots of four or five feet in length the first year; the leaves of these shoots are very large, and the bark of a rich reddish brown. As an undergrowth it may be cultivated to profit, as its rapid growth quickly furnishes a supply of rods fit for corfs, crates, or basket-making.



Genus *Populus*, TOURNF. LINN. *Syst. Dioecia Octandria.*

THE POPLAR.

THE Poplars are mostly trees of very large size, growing with extraordinary rapidity, and equalling if not surpassing in that respect the large timber-sized willows already described. They are natives of Europe, parts of Asia, the west of Africa, and North America. Their wood is light, of a white or pale yellowish colour, very durable when kept dry, not liable to warp or twist when sawn up, and, from its elasticity, yields without splitting or cracking when struck with violence; that of some species is also very slow in taking fire, and when it is ignited burns in a smouldering manner, without flame, on which account it is valuable and extensively used for the flooring of manufactories and other buildings. The catkins of the male plants of most species are large and very ornamental, the anthers being of a rich purplish red colour; they are produced early in spring and before the bursting forth of the leaves. The seed produced by the females is enveloped in a fine cottony substance, which has sometimes been manufactured into paper and cloth.

The well-known tremulous motion of the leaves proceeds, in the *Pop. tremula* (Aspen), chiefly from the flattening of the footstalk, in other Poplars, from the great length and slenderness of this part in proportion to the weight of the attached leaves, so that they are acted upon and put

in motion by a very slight breath of air. The buds of many species, particularly those of *Pop. balsamifera* and *Pop. Canadensis*, are protected and varnished with a strong but agreeably-scented gummy matter, much sought after by honey-bees, who convert it into the substance called propolis, with which they stop chinks and cement their hives to the boards upon which they stand.

The species delight in a rich, moist soil, or in the neighbourhood of running water, but they do not thrive in marshes or soils saturated with stagnant moisture. Hitherto the male plants only of many exotic kinds have been introduced, so that no opportunity has existed of raising plants from seed; their propagation, therefore, is continued by means of cuttings and layers, and in some species by the suckers thrown up from the superficial roots. Considerable confusion appears to exist in regard to the species and varieties, and these difficulties are not likely to be solved till both sexes of the different kinds have been cultivated together, and their produce tested by experiment; on this account, we shall treat the various kinds to be described, as species, although Loudon deems some of them mere varieties, and even thinks that all the kinds now cultivated in Britain may be referred to and included under the generic heads of *Pop. alba*, *Pop. tremula*, *Pop. nigra*, and *Pop. balsamifera*.

The Poplars afford nourishment, both by their leaves and wood, to a great variety of insects in the larva as well as in the perfect state, but as notice will be taken of those most interesting for their beauty or rarity, when describing the different species, we omit any detailed enumeration of them at present.



Populus canescens. SMITH.

THE GREY, OR COMMON WHITE POPLAR.

Populus canescens, SMITH's Flor Brit. p. 1080. Id. Eng. Flor. vol. iv. p. 243.
MICHAUX's N. Amer. Syl. vol. ii. p. 245.
LOUDON's Arb. Brit. ch. ciii. p. 1639.

THE Grey Poplar by many botanists is considered a distinct species; by others it is accounted one of the varieties or forms of the White or Abele Poplar. Which

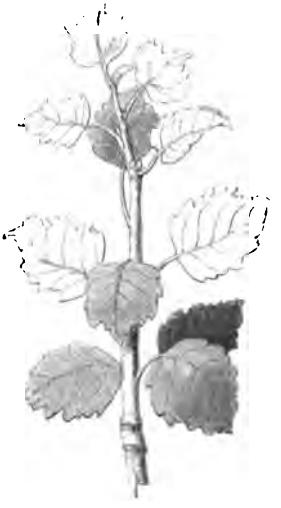
of these suppositions is the correct one, is not for us to determine, and, indeed, the attempt to do so, with our limited botanical knowledge, would be presumptuous. We therefore only venture to suggest that, if they are only varieties of one species, the original stock is more likely to be the *Pop. canescens* than the *Pop. alba*, the first appearing to have a wider geographical distribution, and to be more generally met with in a wild and indigenous state, than the latter.

It is distinguished from the *Pop. alba* by its leaves, which are less deeply and acutely lobed, and, instead of being covered with the thick, snow-white down which clothes the under surface of the leaves of the Abele, the downy substance is sparing and of a grey colour, and, indeed, in some instances, the leaves are almost glabrous. The catkins of the female *Pop. canescens* also are cylindrical instead of oval, and the stigmas eight instead of four. Other characters also are not wanting, such as the growth of the branches, which are more upright and compact in *Pop. canescens*, whose bark is also different in colour from that of *Pop. alba*.



The Grey Poplar attains in favourable situations, such as a loose moist soil on the banks of a river, pond, or like locality, a very large size, frequently running up to the height of eighty or ninety feet, with a diameter of trunk from three to five, and even seven feet.*

* See statistics of this tree in the "Arboretum Britannicum."



When arrived at maturity it presents the appearance of a tree with a wide and spreading head, rather thinly clothed with foliage, and a straight trunk, often clear of branches to the height of thirty or forty feet. It grows with great rapidity, and, as a timber tree, is at its highest state of perfection at the age of fifty or sixty years; for though its existence may be prolonged considerably beyond a century, a decay at the heart or central part of the trunk, usually commences at the age above mentioned.

The Grey Poplar is supposed to be indigenous to Britain, being met with in a wild state at very remote and distant stations; its near relative, the Abele, with which it is frequently confounded, is, on the contrary, said to have been introduced from Flanders, and this seems to be supported by Evelyn's statement of the propagation of the Grey Poplar, where he says, "There is a finer sort of White Poplar, which the Dutch call abeel, and we have of late much of it transported out of Holland."

As an ornamental tree, it is not unworthy of a place in extensive parks and grounds, particularly when planted in low situations, or near to water; it ought, however, to be grouped and massed with trees of equally rapid growth, else it soon becomes disproportionate, and out of keeping with those whose progress is comparatively slow. In

France, and other parts of the Continent, it is extensively used as a wayside tree, for which, Loudon remarks, it is well adapted in a climate like our own, for, growing with a clean trunk, it has no side branches to prevent the admission of light and free circulation of air, both very necessary to the keeping of our highways in a state of good repair. It is also sometimes used to form avenues of approach, and when an effect is wished to be produced in the shortest possible time, answers the purpose perhaps better than any other rapid-growing tree, as its form is often fine, and it carries an ample head. As an avenue tree, however, it is inferior to the elm, beech, lime, and some others, and is, besides, objectionable on account of the numerous suckers it throws up, to a great distance around, and it is, therefore, only in cases where time is considered of great importance, that we recommend it for this purpose.

Hitherto this Poplar, though widely distributed throughout Britain, and long propagated in our nurseries, has never been extensively planted, and rarely in masses together; we are however, of opinion, from its rapid growth, the size it attains, and its clean straight timber, that it would prove a very profitable tree to the planter, in localities where wood of its quality is in demand, such as in manufacturing districts where Poplar and willow wood is used for flooring, machinery, &c.—Plantations composed of it would also have the advantage of furnishing, for an indefinite length of time, a constant succession of timber, as young trees from the suckers would always be in training to replace those annually cut down. It is also well adapted to fill up blanks in young plantations, and we recommend its insertion in narrow belts and strips, where, if not allowed to grow to maturity, it might be kept as

an undergrowth to protect and shelter other trees, and contribute to take away the naked and starved appearance such plantations so generally exhibit.

In cultivating this Poplar in masses, and with a view to produce timber, Loudon recommends the young trees to be planted from fifteen to eighteen feet apart every way: this we consider quite necessary, both on account of its rapid growth and the running nature of its roots, which require space to throw up strong suckers to succeed the first planted trees as they are thinned out; should the soil not be of too moist a nature, the interstices might, when the plantation is first made, be filled with larches, which would yield a crop of useful railing, posts, &c., before the Poplars had reached a timber size.

No tree requires less pruning, even the shortening in of branches is rarely wanted, and large limbs ought never to be amputated, as the wounds readily imbibe the wet, and soon communicate a taint and rot to the trunk of the tree.

The soil most congenial to the nature of the Grey Poplar is a loam near water, but not where the earth is saturated with stagnant moisture. The wood of trees, however, grown in rich moist ground, is more open and spongy in texture than when cultivated upon drier soils, where the species, though it does not make the same rapid advance, thrives very well and attains a large and useful size.

It is propagated by layers, or by suckers thrown up by the roots which run near the surface, and sometimes by cuttings or truncheons, which may be planted any time during the spring months.

The wood is very white, and when dry of a tough nature, allowing nails to be driven into it without splitting,

on which account, and its lightness, it is well adapted for packing-cases; it also affords excellent and durable deals for flooring boards, barn-doors, &c., and by the musical instrument-maker is often substituted for the wood of the lime-tree. In Scotland it is used in mill-work, as well as by the turner and cooper, and for its lightness and smoothness the boards and rollers around which silks and other articles are wrapped, are also made of Poplar wood. In a fresh state it weighs about fifty-eight pounds, the cubic foot, and loses about nineteen in the process of seasoning, as when well dried it is reduced to about thirty-nine pounds.

The leaves of the Grey Poplar are frequently eaten by the caterpillar of *Smerinthus Populi*, and we generally find that of *Clostera reclusa* upon it, as well as others belonging to the *Notodontidæ*.

Towards autumn the foliage is often disfigured by the growth of parasitic plants which abound upon most species of this genus, and *Polyporus ignarius* and other large fungi are frequently seen upon the stools and decaying trunks of this tree.

At Twizell, about eighteen years planted, the Grey Poplar is nearly fifty feet high, the circumference of the trunk, at two feet from the ground, three feet. At Fallowden, the seat of General Sir H. Grey, there is a picturesque tree, nine feet seven inches in girth.



Populus alba. LINN.

WHITE POPLAR, OR ABELE TREE.

Populus alba, LINN. sp. pl. 1463.
SMITH'S Eng. Bot. 623. t. xvi. Id. Eng. Flor. IV. p. 243.
HOOKER'S Br. Flor. p. 432. ed. II.
MACKAY'S Flor. Hibern. part. I. p. 254.

Provincial. Dutch Beech, Great White Poplar.

NEARLY as this tree is allied to the foregoing species, we deem it most prudent under the circumstances of uncertainty in which the genus is involved, to follow the

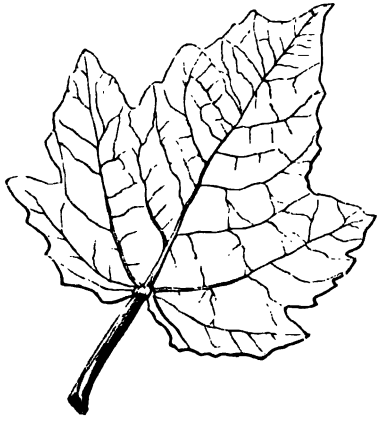
opinion of Sir J. E. Smith, and other botanists, and to treat it as distinct.

In the specific characters assigned to the *Pop. canescens*, the stigmas are stated to be eight; in the *Pop. alba* they are only four in number; the catkins of the female of *Pop. alba*, instead of being cylindrical, are ovate. The leaves are lobed and toothed, in young plants almost palmate, and covered with a thick snow-white down beneath, the upper surface being dark green and smooth. The branches are white, and when young thickly covered with down, and in their growth more horizontal and spreading than in *Pop. canescens*. It grows rapidly, and frequently to as great a size as the Grey Poplar, flourishing best in a rich moist soil, though we have seen it of large dimensions in dryish situations.

It is a native of Europe, and widely dispersed upon the Continent, though perhaps not indigenous to Britain, but first introduced from Flanders or Holland, where it abounds and is extensively cultivated.

The wood of this species is not of so good a quality as that of the Grey Poplar, being softer and more spongy in texture: it may, however, be applied to many similar purposes, but upon the whole, both as an ornamental and profitable tree, we consider it decidedly inferior to the other. In certain situations the contrast produced by the snowy whiteness of its leaves when agitated by the wind, with foliage of a darker hue, has a peculiar and sparkling effect, and it is, therefore, a tree that may occasionally be successfully introduced in landscape gardening. Some of its varieties, also, such as *Pop. acerifolia*, and *Pop. tomentosa*, the Maple-leaved and Hoary Poplar of the nurseries, distinguished by larger and more palmate-shaped leaves, and with even a greater degree of snowy

whiteness, are worth cultivating for their appearance. The *Pop. Egyptiaca*, which Loudon supposes a variety of *Pop. alba*, appears, from the plants we possess, to be very different in character, and more likely to belong to *Pop. nigra*, or else to the group to which the Lombardy Poplar *(Pop. fastigiata)*, belongs.





Populus tremula. LINN.

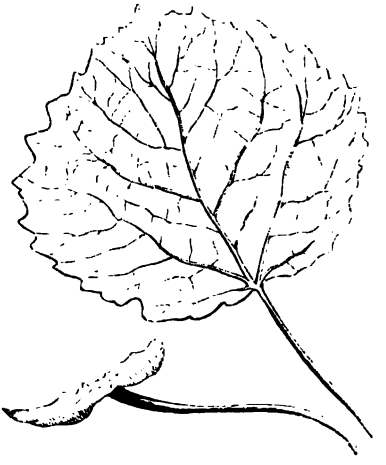
THE ASPEN, OR TREMBLING POPLAR.

Pop. tremula LINN. sp. pl. 1464.
SMITH's Eng. Bot. p. 1909. Id. Eng. Flor. vol. iv. p. 244.
HOOKER's Flor. Scot. p. 289.
MACKAY's Flor. Hibern. part i. p. 254.
JOHNSTON's Flor. of Ber. 1. p. 219.
LOUDON's Arb. Brit. vol. i. ch. ciii. p. 1645.

THE following are the chief specific or distinguishing characters of this tree according to Smith and Hooker. Leaves nearly orbicular, broadly toothed, glabrous on

both sides, petioles compressed, young branches hairy, stigmas four, erect and auricled at the base.

For elegance and beauty of form, the Aspen, when grown in a favourable soil and where nothing has interfered with its developement, is inferior to few of its tribe, presenting the appearance of a tall and, in proportion to its height, rather a slender tree, with a clean straight stem, the head ample and formed of horizontal growing branches, not crowded together, and which, as the tree acquires age, assume, towards the extremities, a drooping or pendulous direction. The foliage is of a fine rich green, and the upper surface of the leaves being somewhat darker than the under, a sparkling and peculiar effect is produced by the almost constant tremulous motion with which they are affected by the slightest breath of air, and which is produced by the peculiar form of the foot-stalks, which in this species is flattened, or vertically compressed in relation to the plane of the leaf, causing a quivering or double lateral motion, instead of the usual waving motion, where the footstalk is round, or else compressed horizontally.



On the margins of woods in a rich moist soil, and where it has had sufficient room and air to acquire its full developement, we have often admired the effect produced by the Aspen in combination or in contrast with the

foliage of other trees; it is also frequently an interesting object on the wooded slopes of highland scenery, and in Scotland adorns the margins and hanging woods of its most interesting and beautiful lochs. Upon Loch Katrine it mingles with the birch, and clothes, almost to the exclusion of other trees, the classic islet of the Lady of the Lake.

It is indigenous to Britain, being found throughout England in moist woods and damp situations, and in Scotland it extends as far north as the borders of Sutherland. In Aberdeenshire, near Braemar in the woods of Invercauld, it grows at an elevation of sixteen hundred feet, and we have seen it as high in different parts of Argyleshire. In Ireland, according to Mackay, it is found native in the County of Dublin, and several other districts. Upon the European continent its distribution extends over the southern as well as the northern parts, nearly to the verge of the Frozen Ocean; in Russia, Loudon states it to be very abundant, particularly in the woods around Moscow, and he mentions the interesting fact that in the year 1813, the year following the burning of that ancient city, innumerable seedling plants of the Aspen sprang up in every direction among the ruins, no doubt from seed that had been wafted thither by the wind from the neighbouring woods. It is also a native of Asia Minor, and the whole of the Caucasian range. If it were not for the innumerable suckers thrown up to a great distance by this tree, its ornamental properties would claim a more extensive cultivation in landscape scenery than it has hitherto received, but this disadvantage is of so serious a nature in pleasure-grounds, lawns, and meadows, that it must always be sparingly introduced in such situations; the objection, however, does not extend to large woods, or

wooded slopes in upland districts, where it might be planted to advantage in the moister parts, as it grows rapidly and soon attains a profitable size.

The wood is white, light, and rather tender, but well adapted for the staves of herring-casks, milk-pails, &c. It is also employed by turners, and, cutting clean and sweetly with the chisel, is adapted for carving in wood; it is also applicable to various purposes in house carpentry, provided it be kept dry, but in this respect is much inferior to the wood of the Grey and the Black Italian Poplars. The bark contains a considerable percentage of tannin, and is used, with that of other species, by the tanner, and it was the favourite food of the beaver when that animal abounded in the north of Europe. It is sometimes used as a vermifuge for horses, and in some countries is a domestic medicine for scorbutic and other cases.

Unlike many of its congeners, the wood of the Aspen burns with a clear flame, but gives out very little heat; its value as a fuel, compared with the beech, being, according to Loudon, as 970 to 1540.

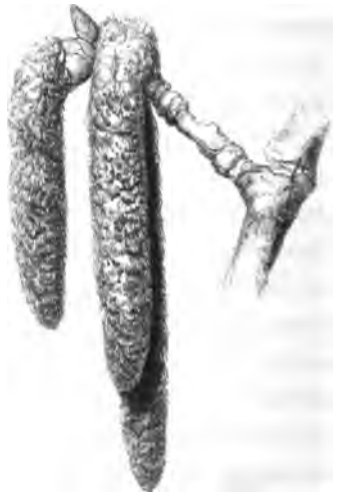
The spray and leaves are greedily eaten by deer, goats, sheep, and other herbivorous quadrupeds, and in countries where hay and fodder are scarce, the young shoots and leaves are cut and dried for winter food.

The soil in which it grows most luxuriantly is a moist loam, but as the roots run near the surface it does not require it to be deep. In such situations, planted in mass at six or eight feet distance, it will, in the course of twelve or fourteen years, make a profitable return, as at that age it will be of sufficient size to saw up into herring-barrel staves, for which at present there is so great a demand. It attains perfection in fifty or sixty years, after which it begins to decay at the heart. At this age it has fre-

quently reached a height of seventy or eighty feet, with a diameter of three or four feet.* In dry soils the Aspen never reaches a great size, though it lives many years, and the wood is of good quality.

It is easily propagated by the suckers, which are thrown up in great abundance, as well as by the cuttings of the roots, which succeed better than those taken from the branches of the tree. Young seedlings are also abundant in all woods where it grows, and these are perhaps preferable to plants raised by the other methods we have named.

The leaves are eaten by the caterpillars of many nocturnal Lepidoptera, as by that of *Cerura vinula*, *Notodonta ziczac*, &c., and by many of the Chrysomelidæ, among which *Phaëdon vitulina*, is sometimes very numerous.



The red warty-looking excrescences upon the leaves and leaf-stalks are produced by wounds inflicted by the ovipositor of a tipula which selects these parts as depositories for its eggs.

In some countries curious superstitions existed, and indeed still exist, respecting the Aspen, originating from the constant tremulous motion of the leaves; thus, by the Highlanders it is supposed to be the wood of

* See the statistics of the Aspen in Loudon's "Arboretum Britannicum."



which the holy cross of Christ was made, and on this account they believe its leaves can never more remain at rest. Its peculiar quivering motion has also frequently arrested the attention of the poet, and many allusions to it are made by modern writers, among which none is more beautiful than the well-known lines in Marmion:—

> "Oh! woman, in our hours of ease,
> Uncertain, coy, and hard to please,
> And variable as the shade
> By the light quivering Aspen made;
> When pain and anguish wring the brow,
> A ministering angel thou!"

The vignette represents one of the Aspens growing upon the Lady's Islet, in Loch Katrine. Our figure from a tree growing at Twizell.





As a species nearly allied to the Aspen, but as an ornamental tree superior to it in many respects, we deem the *Populus Græca* of Aiton, and other writers, worthy of a few remarks.

The specific term of *Græca*, and classic appellation of *Athenian Poplar*, naturally lead to the supposition that this species is indigenous to Greece, and that it derives its name from the city of Minerva; such an opinion we entertained in common we believe with many others, and even botanical writers gave weight and currency to

the supposition, as Willdenow records it in his "Species Plantarum" as a native of the islands of the Archipelago. It appears, however, from the account contained in the "Nov. du Hamel," and from other evidence, that the North American Continent is its real native country, and that growing abundantly in a particular township called Athens, it received from it the imposing and euphonious title of Athenian Poplar. This origin Loudon thinks the more probable from the circumstance of its having been first introduced by Hugh, Duke of Northumberland, who served in America during the colonial war, and imported from thence a great variety of American trees, many of which now adorn the grounds at Sion House, and Alnwick Castle, at which latter place the original tree from whence our own plants and those disseminated in the north of England are derived, was first planted. It is a tree of handsome appearance, with a stem rather slender in proportion to its height. The bark, until the





trees become of a considerable size and age, is very smooth, and of a pale greenish grey colour, and the leaves which are roundish-ovate in shape and terminate in a sharp point, are of a pleasant, deep, and rather glaucous green; they expand early in spring, immediately succeeding those of the Balsam Poplar, and have the advantage of being retained till a late period in autumn. The catkins are shorter than those of the Aspen, and come out at a much earlier period.



It grows rapidly, young trees often making shoots in one season of five or six feet in length, and, though a slender-stemmed tree, has the valuable property of resisting the wind, and is never seen, even in the most exposed situations, but with an erect and perpendicular trunk.

The same objection, however, attends the cultivation of this species, as that of the Aspen, viz., the throwing up of numerous suckers from the surface roots, and on this account its cultivation as an ornamental tree must always be limited, and of the propriety of planting it in mass with a view to profit, in outlying situations, we cannot venture an opinion, having had but little experience of the properties and qualities of the wood.

It is readily propagated by the suckers it throws up, and by layers, being one of the few belonging to the genus that does not not succeed by cuttings. The leaves are a favourite food of the caterpillar of the Poplar Hawk

Sphinx, *Smerinthus populi*, and we have also found upon it those of *Cerura vinula*, *Notodonta ziczac*, *Clostera reclusa*, *Leiocampa dictæa*, and *Calyptra libatrix*.

The specific characters, according to Willdenow, are, branches round and smooth, leaf-stalks compressed, the disk of the leaves roundish-ovate, the end acutely pointed, and with a shallow sinus at the base, serrated, with equal adpressed teeth, smooth, except being slightly ciliated on the edge.

At Twizell, twenty years planted, it is thirty-five feet high, and two feet six inches in circumference at two feet from the ground. Our figure is a portrait of this tree. At Howick Hall, the seat of the Earl Grey, there are specimens of larger dimensions.





Populus nigra. LINN.

BLACK POPLAR.

Populus nigra,

LINN. sp. pl. 1464.
SMITH'S Eng. Bot. t. 1910. Id. Eng. Flor. iv. p. 245.
HOOKER'S Flor. Scot. p. 289.
MACKAY'S Flor. Hibern. part I. p. 251.
LOUDON'S Arb. Brit. part III. p. 1652.

THE specific or botanical characters of this species, according to Smith and Hooker, are, leaves deltoid, pointed, serrated, smooth on both sides, catkins lax, cylindrical, stigmas four, simple and spreading.

The wide distribution of this species throughout Britain, and the localities in which we have seen it growing apparently in a wild and natural state, are strongly in favour of its being indigenous, although Sir W. J. Hooker, in the "Flora Scotica," mentions it as of doubtful origin; nothing however is said by the old English authors to lead to such a conclusion, and we find that its geographical distribution is nearly co-extensive with that of *Pop. alba*, and *Pop. canescens*. It is a tree of rapid and vigorous growth, and attains the size of one of the first magnitude, and as it generally possesses a fine stem and an ample head, it is often highly ornamental when planted in an appropriate situation, and in combination with other quick-growing trees. Formerly it was freely introduced into plantations, but within the last twenty years some of the American species have taken its place, particularly the *Pop. monilifera*, or Black Italian Poplar, one of the most valuable and usually the largest of the genus. The Ontario Poplar, *Pop. candicans*, a species nearly allied to, if not a variety of, the *Pop. balsamifera*, Balsam Poplar, or Tacamahac, has also lately come into fashion, but as it is only a tree of the second rank, it is not likely to be cultivated for profit, but merely for the effect of its tufted and dark green foliage, and the pleasant balsamic odour diffused by the buds and newly expanded leaves in early spring.

In a rich moist surface soil, particularly in the vicinity of running water, the growth of the Black Poplar is very rapid, being at the rate of three or four feet every year; it attains perfection in forty or fifty years, at which age it ought to be cut down if meant for use, as it begins to decay soon after this period.

The wood is of a pale yellowish white colour, soft, and easily worked, and is much used by turners for bowls,

and other wooden ware, and indeed is applicable to most purposes for which the timber of the Poplars is adapted. Upon the Continent, and especially in Flanders, it is extensively planted as a hedge-row tree together with the White Poplar, and cut down at the age of twenty-four or twenty-five years, to make sabots or wooden shoes, for which its lightness and tenacity of fibre adapt it.

In dampish situations, planted in mass, or mixed with the Grey Poplar, where poles, small rafters, and railing, are in demand, it would make a quick return, as a growth of eight or ten years would render it fit for these purposes.

When cut over young, it throws up numerous shoots, which may be used like willows for basket-making; it also bears lopping much better than the species already described, and as a pollard produces an abundant supply of stakes and poles, but is almost useless as fuel, in which respect, compared with the beech, it is stated to be as 792 to 1540.

The bark is used by the tanner, and in Russia it enters into the manufacture of Morocco leather, and as it becomes very thick and corky upon old trees, it affords a material to support and float the nets of the fisherman.

The foliage of the Black Poplar is of a pleasant pale green, smooth and shining, and producing sparkling and ever-varying lights, as it flutters with the gentlest zephyr, in the beams of the sun; it is, however, late in expanding, as it is seldom in full leaf before the end of May or beginning of June, a disadvantage that also attends the cultivation of the Black Italian Poplar.

The catkins of the male appear in March or April, long before the expansion of the leaves, and, being large and of a deep red colour, produce a rich effect at that early period of the year.

The capsules or seed vessels of the female are round, and contain a pure white cottony down, in which the seeds are enveloped; attempts to turn this substance to profit in the manufacture of hats, cloth, and paper, have been made, but owing to the shortness and want of elasticity of its fibre, without much success.

As in several other species, the buds are protected by a gummy varnish, having an agreeable smell, and which formed the *unguentum populeon*, or profitable ointment of Gerard; Loudon also mentions that after being macerated in boiling water, bruised in a mortar, and pressed, they yield a fatty substance, which burns like wax, and emits a fine odour.

Several of the caterpillars we have already mentioned as feeding upon the leaves of other poplars, are also found upon this tree; it also produces protuberances of varied form and shape upon the petioles of the leaves and young shoots, which are the nidi of the *Aphis populi*. Among the statistics of existing trees mentioned in the "Arboretum Britannicum," are several from seventy to eighty feet high, and one upwards of ninety, with a trunk of more than five feet in diameter. It is readily propagated by cuttings or truncheons, which may either be inserted at once, where they are intended to remain, or rooted for a season in the nursery.



Populus monilifera. Ait.

BLACK ITALIAN, or NECKLACE-BEARING POPLAR.

Populus monilifera,

Ait. Hort. Kew. ed. 1, iii. p. 406.
Pursh's Flor. Amer. Sept. 2. p. 618.
Watson's Dend. Brit. t. 102.
Loudon's Arb. Brit. p. iii. ch. iii. p. 1657.

The specific characters of *Pop. monilifera*, which seems nearly related to the Canadian Poplar (*Pop. Canadensis*),

and of which kind Loudon conjectures it may possibly be an improved variety, are as follow:—annual shoots more or less angular, the branches becoming round after the first year; leaves deltoid, glabrous, except the edge, which when young is ciliated, generally subcordate at the base, serrated, the serratures with incurved points, tip pointed and acute, petioles compressed at the upper part, slender, generally as long as the disk of the leaves. Catkins of the male five or six inches long, the flowers upon pedicles, stamens sixteen. Female with about forty flowers in a catkin, stigmas four, dilated and jagged.



Although bearing the name of Black Italian Poplar, it is still a matter of uncertainty to what country it really belongs, as no direct proof of its having been found in a wild and natural state, either in Europe, upon the American continent, or elsewhere, has yet been produced. There seems no doubt, however, of its having been first introduced into Britain from North America, first in 1772 by Dr. John Hope, who brought it from Canada, and again by a Scotch gentleman, a few years afterwards, from whom it was obtained by the Messrs. Dickson, Nurserymen at Hazendean, who first brought it prominently into notice and extensive cultivation, and to whom it is also indebted for its present name; Mr. Archibald Dickson having understood that it was a species common to

Italy as well as to North America. We may, however, remark that, although imported to England from America, it has never been found growing in a wild state in the latter country, neither of the Michauxs, father or son, having met with it, and Pursh it appears has only seen it growing in gardens, and never in a natural state. We are not aware how long it has been known or cultivated in Europe, but probably for a considerable period, as it has been planted to a great extent in parts of Switzerland, and is well known to the French by the name of *Peuplier Suisse*, so that there does appear to be some foundation for another conjecture of Loudon's, viz. that it may have originated in Switzerland or Italy, and been afterwards carried from thence to North America. If it be only a variety of some other species, a circumstance by no means improbable, it may, if of European origin, either have sprung from the seeds of the Black Poplar, *Pop. nigra*, or from those of the Lombardy Poplar, *Pop. fastigiata*, (which Loudon again supposes may itself be a variety of *Pop. nigra*,) as it appears to partake in an intermediate degree of the character of both kinds, being more fastigiate in its growth than the one and less so than the other; or if it originated in America, from the *Pop. Canadensis*, to which it is generally allowed to appear nearly related. Of all the Poplars hitherto introduced, it is, we think, by far the most valuable, looking to it in the light of a useful and profitable timber tree, as it grows with astonishing rapidity, and produces a timber of large scantling and excellent quality, equal if not superior to that of any other of its genus. During youth the side branches are subordinate to the main stem, which shoots up erect and perfectly straight to a height of eighty, ninety, and even one hundred and twenty feet. The ramification of young

trees, though not so fastigiate as that of the Lombardy Poplar, is more so than that of most other kinds; and it is not till it has reached the age of twenty-five or thirty years, and attained the dimensions of a first-rank tree, that its principal branches begin to swell and to take a more horizontal and spreading direction. To attain its greatest developement it requires a free moist loam, and it thrives particularly well near to running water; it also succeeds and grows to a very large tree upon stiffish loam, and even upon light and sandy soil makes good progress. As a hedge-row tree in exposed situations we have also found it to succeed beyond expectation, as it resists or stands well up to the wind, and, in growth far outstrips the ash, elm, and indeed any other tree, except perchance the *Salix alba* and *Salix Russelliana*. It requires both air and space to arrive at perfection, and does not succeed well in mixed plantations closely cooped up by other trees, or even when planted thickly by itself; therefore, when intended for full-sized timber and grown in mass, the plants ought to be put in at wide distances or from sixteen to eighteen feet apart. It may, however, be planted much thicker when intended for poles, small rafters, &c., as the trunk in a few years runs up to a very great height, without much taper or difference of diameter; and such plantations upon a good soil we have no doubt would yield a great and rapid profit, where wood of this description is in demand.

The wood is of a greyish white colour, tough when seasoned, and if kept dry very durable; its great size renders it fit for the largest buildings, and as flooring for manufactories and other erections nothing can surpass it, as in addition to the property of not splitting by percussion it possesses the peculiar advantage of not easily

taking fire, and even when ignited burning without flame or violence.

As an ornamental tree it well deserves a place in extensive grounds, its spiry height and pyramidal form before it becomes aged, being well calculated to break long horizontal lines, or the monotonous effect of round-headed trees; it also, in a great measure from its semifastigiate growth in the young state, supplies the place of the Lombardy Poplar in such scenery, either of wooded landscape or in combination with buildings, as is improved by the presence of that tree. The principal objection to its frequent introduction in ornamental scenery is the late period of its coming into leaf, and the comparatively early one at which the foliage is shed; in the north of England it is seldom in full leaf before the middle of June, and is again denuded by the end of October.

The caterpillars of *Cerura vinula* and *Cer. furcula*, as well as that of *Smerinthus populi*, feed upon this Poplar. We have also found those of several of the notodontidæ, that of *Calyptra libatrix*, and also the larva of a large tenthredinous fly; the stem of young trees is also subject to the attack of *Cryptorynchus lapathi*, and in some seasons we have had several plants completely drilled by the larvæ of this weevil.

In addition to the trees particularized in the "Arboretum Britannicum," one of the largest and finest, and perhaps, also, one of the oldest specimens of the species in Britain, is now growing at Maxwell heugh, near Kelso. The trunk, previous to dividing into the enormous limbs which form the head, is sixteen feet and a half in height; at the base it measures thirty-one feet in girth, at two feet above the ground twenty-one feet, and at ten feet above the base eighteen feet; its solid contents are found to be upwards

of nine hundred feet, and yet this enormous vegetable production cannot be much above sixty years old. At Twizell, planted in light free loam about twenty-two years ago, it is upwards of sixty feet high, with a straight continuous trunk, and measures in girth, at two feet from the ground, five feet five inches: others of a younger age show an equal rapidity of growth.

It is easily propagated by cuttings made of the young wood, which ought to be planted during winter or early spring. We commonly keep them in the nursery for a year or two, by which time they become well rooted and attain a height of five or six feet, and never fail to succeed when transferred to their permanent stations.





Populus fastigiata. DESF.

LOMBARDY POPLAR.

Populus fastigiata,	DESF. Hist. Arb. ii. p. 469.
	LOUDON's Arb. Brit. part III. ch. ciii. p. 1610.
Pop. dilatata,	AIT. Hort. Kew. ed. III. p. 406.
	WILLD. sp. pl. iv. p. 804.

IN its close fastigiate growth and cypress-like form, which seems to be retained during the whole of its existence, the Lombardy Poplar is too conspicuous not to be immedi-

ately recognized and readily distinguished from all other species of the genus; the trunk also is much more deeply furrowed than that of any other Poplar, and the grooves often assume a spiral or twisting direction, and give the entire stem the appearance of being made up of several plants that had united and become connected together. It grows in favourable situations and in good soil with great rapidity, often attaining a height of sixty or eighty feet in less than thirty years, and one instance is mentioned in the "Arboretum Britannicum," of a tree, still we believe growing at Great Tew in Oxfordshire, that at fifty years old had reached the spire-like height of one hundred and twenty-five feet.



As might be expected in a tree of so rapid a growth, its duration is very brief compared with the longevity of slower-growing trees, and most of the plants first introduced into the kingdom, which took place about eighty years ago, are now either dead or in a state of decay; such is the case with those at Blenheim mentioned by Gilpin, which were planted about the year 1760, or soon after Lord Rochford had imported the first cuttings of this Poplar from Turin.

By some dendrologists the Lombardy Poplar is considered indigenous to that province or district of Italy, and the fact of young plants of this kind as well as of *Pop. nigra* springing up on the banks of the Po, where the surface soil has in part been washed off by the over-

flowing of that river, is adduced by Signor Manetti in favour of such an opinion, basing it on the presumed fact that the seeds had there lain buried for many years; but, as Loudon justly observes, it is as probable that the plants in question may have sprung from fresh seeds disseminated by the winds the same season, and which would naturally vegetate freely and rapidly upon soil thus prepared for their reception; the circumstance also, of a tree so peculiar in its aspect remaining unnoticed by ancient Latin authors, and among the rest by Pliny, who would scarcely have overlooked it had it been known in his day, as well as the additional and singular fact that the Lombardy Poplar was not introduced into Tuscany till 1805, are all against the supposition of its Italian origin, and strongly in favour of that of Bosc and other botanists, who suppose it to have been introduced into Italy from Persia, where it abounds, and of which country, as well as the Himmalayas, it is believed to be a native.

As a useful and profitable timber-tree, the Lombardy Poplar is greatly inferior to some of the species already described, the twisted and deeply-furrowed trunk, even of the tallest and largest trees, cutting to much waste, and affording boards of only a moderate size when sawn up. The wood is also softer and more spongy than that of the Black, and the Black Italian Poplars, and rapidly decays unless kept perfectly dry.

In Italy, most of the vessels in which grapes were carried home from the vineyards, were formerly made of the wood of the Lombardy Poplar, its lightness rendering them, even when of very large size, easily manageable; of late years, however, its culture has given way to that of the *Pop. nigra*, a tree found to be more generally useful, and whose wood is equally light, and therefore as well

adapted for the purpose above-mentioned. In France, fences are frequently formed of this tree; plants, when about six feet high, being run in lines six inches apart, they are then connected by a horizontal rod about three feet above the ground, and thus treated, produce a fence the first season. In five or six years, the trees composing the fence are either all cut down for various minor purposes, or else they are thinned out, and a certain number left to attain a timber-like size, which they do in eighteen or twenty years; but this mode, Loudon observes, is only followed when the fields enclosed are of such a size as not to be injured by the shade of the trees.

As a tree requiring a free circulation of air and room, it does not thrive in close mixed plantations, or even in masses by itself, on which account it is unfit to be planted even as an undergrowth to furnish poles or inferior sized wood for minor purposes. In Britain, therefore, it is cultivated almost exclusively as an ornamental tree, for which its towering height and spire-like form eminently qualify it, particularly when associated with buildings, and so used either as a counterpoise or supporting mass to these, or to break the uniformity of long horizontal lines. Its use, however, in landscape composition, requires skill and judgment, and a thorough knowledge of the effect to be produced, for placed inadvertently, or without attention to surrounding objects, it more frequently mars than improves the scene, a fact that must frequently have been observed where this tree has been largely and unskilfully introduced.*

From its harmonising so well with buildings, the small

* In the "Arboretum Britannicum" our readers will find some appropriate remarks on the effects produced in landscape by this tree, illustrated by excellent woodcuts.

space it occupies from its close fastigiate growth, and its patient endurance of smoke, it is a tree peculiarly adapted to ornament cities, towns, and villages, and we should therefore like to see it more freely planted than it has hitherto been, at least in the North of England and Scotland. Around our country residences its use should be much more restricted than in urban scenes, though its introduction is often attended with the happiest effect, and indeed almost necessary to break the monotony of horizontal lines formed by ornamental plantations of round-headed trees; but, as we have previously hinted, judgment and taste must be consulted in their disposition, so as to produce the best and wished-for effect. At the period Gilpin wrote his "Forest Scenery," the Lombardy Poplar had not been long introduced; he speaks, however, in favourable terms, of the young trees growing in the park at Blenheim, then scarce twenty years old, and notices a beauty almost peculiar to itself, viz. the waving line it forms when agitated by the wind, and which he aptly compares to that of an ostrich feather on a lady's head, moving in one simple sweep from the top to the bottom, or, as Leigh Hunt poetically describes it,—

> ——————— "The poplar's shoot,
> Which, like a feather, waves from head to foot;"

and not partially agitated, as is the case with most other trees.

It is sometimes planted so as to form a hedge in nurseries, and being cut even at a certain height, and regularly trimmed, becomes a thick and verdant fence; Loudon also recommends it as an excellent tree for sheltering fields or gardens in a flat country, in this case certainly more useful than picturesque.

It is propagated by cuttings of the young wood which

root freely, and are fit to be moved to permanent stations after one or two years' growth, but to ensure a large and rapid-growing tree it must be planted in soil of more than ordinary quality. The specific characters are,—disk of leaf deltoid, wider than long, the whole of the edge from the base crenulated, glabrous on both surfaces, petiole compressed. The leaves are the food of various lepidopterous caterpillars, among which are those of *Smerinthus populi*, *Cerura vinula*, and *furcula*, and some of the Notodontidæ.





Populus balsamifera. LINN.

BALSAM POPLAR, OR TACAMAHAC.

Populus balsamifera,

LINN. syst. 45.
AITON'S Hort. Kew. ed. II. p. 397.
MICHAUX, Arb. N. Amer. ii. p. 237.
LOUDON'S Arb. Brit. part III. ch. ciii. p. 1673.

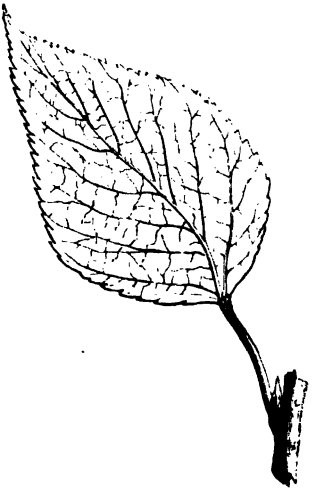
THE early period at which it bursts into leaf, cheering the eye with the first green tint of spring, and the fine balsamic odour emitted by the buds and tender leaves,



are the chief recommendations of the Tacamahac, for unless planted in a sheltered situation and a rich soil it seldom attains to more than the dimensions of a tree of the second rank, and that without assuming any beauty or peculiarity of form to render it a conspicuous object in ornamental planting. It is a native of North America, reaching to high latitudes, and was found by Sir John Franklin to form the greater part of the drift timber on the shores of the Arctic Sea. It is also indigenous to Northern Asia, being common in Siberia, the Altaic range, and Dahuria. In these districts, according to Pal-

las, it is seldom seen of large size, but generally as a low round-headed tree. In Canada, according to Michaux, it sometimes reaches a height of eighty feet with a trunk of three feet in diameter.

The wood is of little value, being soft and spongy, and is only fit for packing-boxes, or where a light material is required. It appears to have been one of the earliest trees introduced into England from the American continent, having been cultivated, according to Aiton, in Hampton Court garden in 1692. Into Scotland its introduction was at a much later period, as we are told by Dr. Walker that the first plants were reared in 1768 in a nursery-ground at Leith, from seeds sent from Canada. For a few years it grows very rapidly, and the leaves are large and handsome, but as it acquires age they diminish in size, and the tree generally acquires a scrubby appearance. The shoots are round, and the buds, which are full and large, are protected by a gummy and highly-scented matter, which used to be sent from Canada under the name of *Baume focot*, and was collected from the trees in spring, when the increasing temperature of the season partly melts the resinous varnish, and it collects in drops on the points of the buds.



The leaves are of an ovate-lanceolate shape, the edges serrated, with adpressed teeth, and of a pale

yellowish green when first expanded, but when matured of a deep green on the upper surface and whitish green beneath, with glabrous reticulated veins. The catkins of the male are long, the stamens of a purplish red colour. Instances of hermaphrodite flowers are mentioned as having been found on some trees in England, but they are very rare. Its roots run near the surface, and it throws up numerous suckers, on which account it ought never to find a place on lawns or the vicinity of gardens. In addition to the list of Tacamahacs mentioned by Loudon, we may add, a very fine round-headed tree at Belford,* about fifty feet high, with a trunk, at a foot from the ground, seven feet nine inches in circumference; at Twizell, about eighteen years planted, it is thirty-five feet high, and three feet girth at the base.

The leaves are the favourite food of the caterpillar of *Smerinthus populi* as well as of some of those of the genus *Cerura*, also of that of *Notodonta ziczac*, &c.

Nearly allied to the Tacamahac is the *Pop. candicans*, Ontario Poplar, also introduced from North America, and cultivated sparingly for the last thirty or forty years as an ornamental tree. Its leaves are heart-shaped, and much larger than those of *Pop. balsamifera*, and when young it is not quite so fastigiate in its growth.



* Our first figure is a portrait of this tree, that on the opposite page of younger growth, showing its usual form.

The buds are large and covered with a gummy substance, but the odour, though approaching to that of the Tacamahac, is even more agreeable and perceptibly different. It grows rapidly at first in a rich moist soil, but seldom attains the dimensions of a very large tree, and it possesses the same disadvantage that attends so many of the tribe, that is of throwing up suckers to a great distance around; we can, therefore, only recommend it as a variety to be planted in woods, or where the underwood it produces is not considered a nuisance. It is readily propagated by cuttings as well as by suckers, as is the case with the Tacamahac.

The wood is soft and not of much value, at least we have not heard anything in its favour, or of its applicability to particular purposes.





Genus *Alnus*. TOURNF.

Nat. Ord. Betulaceæ. LINN. *Syst. Monœcia Tetrandria.*

Alnus glutinosa. GÆRT.

THE ALDER.

Alnus glutinosa, GÆRT. ii. p. 54.
SMITH'S Eng. Flor. iv. p. 131.
HOOKER'S Flor. Scot. 271.
LOUDON'S Arb. Brit. part. III. ch. civ. p. 1678.

THE specific characters of this species, as contained in our best botanical authors, are, leaves roundish cuneiform,

wavy or obtuse lobed on the margin, serrated, and somewhat glutinous, downy at the branching of the veins beneath.



The Alder is one of the commonest of our indigenous trees, being found upon the margins of all our rivers and streams, as well as in damp and marshy ground, and even in morasses and swamps of the wettest description. It is only, however, where the soil is good and at the same time well watered, but not actually swampy, that it attains a large timber-like size; under such favourable circumstances it often reaches a height of fifty or sixty feet, with a trunk of many feet in circumference; of such a magnitude are the fine specimens still existing in the bishop's park at Auckland Castle, and which we find mentioned in Gilpin's "Forest Scenery," and such are many of those which his accomplished editor, Sir T. Dick Lauder, describes as growing upon the banks of the Findhorn and its tributaries, and to these might be added many others which we have met with in our excursions in Scotland and in the north of England. In other situations less congenial to its full developement, whether from an excess of moisture as in swamps, or on the contrary where the ground is porous and the roots cannot retain the

requisite quantity of moisture, it becomes stunted in its growth, and is usually seen as a low scrubby-looking tree, seldom rising above twenty or thirty feet in height, and frequently not beyond the dimensions of a large bush. It possesses a very wide geographical distribution, being found throughout the whole of Europe in localities suited to its nature, as well as in the north, the east, and west of Asia, in northern Africa, and a species said to be identical with it inhabits Canada and other parts of the north-west coast of America.

Associated with scenery of a certain description, such as the banks of a stream, whether it be of the slowly-gliding kind, as that of the sluggish Mole, which in Gilpin's estimation derives its principal interest and effect from the presence of this tree, or of the rocky-bottomed and swift-running rivers of the northern parts of the kingdom, the Alder is always an expected, and at the same time a pleasing picturesque adjunct. In cases of the former description it ornaments and gives value to scenes, which otherwise would be tame, nay, unsightly; and in the latter, from the appropriateness of its presence in the vicinity of the limpid fluid, it gives even an additional value to that varied and romantic scenery which their wild and often precipitous banks present.

It is not however from association alone, or the effect produced by combination with other objects, that we look upon the Alder with a favourable eye; individually and independent of extraneous circumstances we consider it to be a tree of no mean merit in an ornamental point of view, at least in those instances where it has been allowed to attain its largest dimensions, and been favoured by soil and situation. Its form, in such cases, is often imposing as well as picturesque, assuming, as Sir T. D. Lauder

observes, "much of the bold resolute character of the oak;" and though the deep and dusky green of its foliage has been objected to as investing it with a melancholy aspect, we think that this gives character to the tree, and enhances its interest; and even if its foliage be less generally pleasing than tints of a lighter and livelier hue, the defect, if allowed to be one, is compensated by the retention of its leaves to a very late period of the year, as it is frequently quite green long after the other trees of the forest have become entirely denuded.

Favourable, however, as our opinion of the Alder may appear to be, viewing it as an ornamental tree, and much as we should regret its disappearance from scenery where it is an expected and natural attendant, we are far from advocating its cultivation upon an extended scale, or as a profitable timber-tree; on the contrary, we advise the planter to be chary in admitting it into his grounds, and when he does, always under certain precautions and in limited numbers. In many treatises on planting we find the Alder mentioned, and recommended as a proper plant to fill up moist tracts in woods and artificial plantations; but the authors who thus recommend it, seem not to have been aware that in so doing they were giving directions which, if adopted, would soon convert into a complete morass or bog, ground that otherwise by draining and planting with trees of a different nature might be rendered comparatively dry and productive. Such, however, is the nature of the Alder, that wherever planted it attracts and retains the moisture around it. This effect is occasioned by the nature of its roots which are chiefly composed of a huge mass of small fibres, whose capillary attraction is always in action, and prevents the escape of the redundant water in the vicinity of the plants. This pro-

perty of creating swamps we have repeatedly observed in the Alder, and from experiments we have made, are fully convinced that a plantation of Alders would soon render the ground (even should it be previously of tolerably sound and dry quality,) soft and spongy, and in time convert it into a decided bog.

The Alder, therefore, in our opinion, ought never to be planted in low bottom ground of a moist or wet nature, (except in particular localities, such as where it is cultivated in the coppice or holt fashion, for the valuable charcoal it produces); if introduced at all, it ought to be where it cannot well retain the water in any quantity around its roots. All moist and spongy land we would recommend to be well drained by open cuts, and then planted with trees whose roots, instead of retaining water, act rather as drains; such are some of the poplars, the ash, &c., whose roots are thick, and extend horizontally to a great distance on every side.

The wood of the Alder is soft and of a homogeneous texture, possessing but a moderate share of lateral and longitudinal adhesion; submerged in water or buried under ground it is almost incorruptible, and on this account, both in ancient and modern times, has been extensively used for piles in the foundation of bridges,* and other water works; exposed to the alternation of dryness and moisture it rapidly decays, as a pole or a post will not stand good for more than a year, but under cover and kept always dry it is very durable and remains unchanged, provided it has previously undergone some preparation, such as impregnation with smoke or pyrolignous acid, or has been saturated with a solution of lime

* Evelyn informs us that the bridge of the Rialto, at Venice, is founded upon piles of the Alder.

in moss water to prevent the access of the small beetle (*Anobium striatum*), which would otherwise soon attack, and perforate it with its galleries.

In Scotland and the north of England it is frequently made into chairs and tables, the latter of which, when formed of the planks of old and knotty trees, are very beautiful, exhibiting, as Sir T. D. Lauder expresses it, "all the beauty of the curled maple, with the advantage of presenting a deep rich reddish tint." Its principal value, however, at present, is for sawing up into herring-barrel staves, for which the demand is yearly increasing, and for this purpose it is annually felled to a great extent upon all the banks of the Highland rivers. Bog Alder, or wood that has lain long in peat mosses, is as black as ebony, for which it is often substituted, but it may be detected by its want of lustre.

The wood when standing is white, but the moment it is cut into, the surface of the wound becomes of a deep red, which gradually fades into a flesh colour, which it ever afterwards retains. The bark contains a large percentage of tannin, and is used by the tanner with that of other trees; it is also employed for dyeing shades of red, brown, and yellow, and with copperas, (sulphate of iron,) produces a good black. As we have already observed, the charcoal of the Alder is very valuable, and considered one of the best in the manufacture of gunpowder; on this account it is cultivated as a coppice wood, or in holts by the proprietors of the various gunpowder manufactories, and cut over every five or six years. The ramification of the Alder is stiff and unyielding, and in very large and old trees assumes, in some degree, the appearance of that of the oak; the young shoots in saplings, and when in vigorous growth are trian-

gular, but afterwards become round. The bark in old trees is full of clefts and of a dark colour, and the leaves, before they expand, are beautifully folded longitudinally, between the two whitish green stipules which enclose them. The male catkins appear in the autumn, but they do not flower till the following spring, when the female catkins, in the form of small conical cones, are produced on branched footstalks near to them.

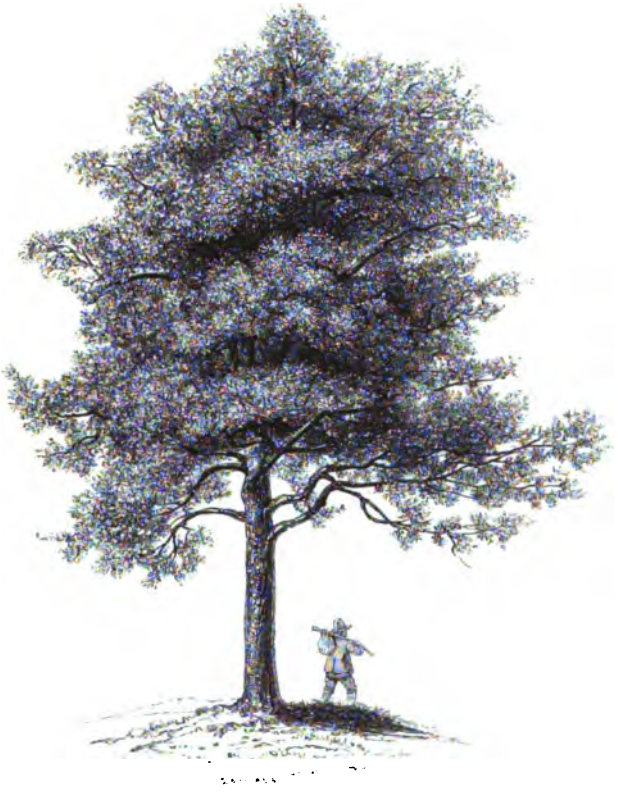


The Alder is best propagated from seeds, which always produce more vigorous plants than cuttings or truncheons, as recommended by Evelyn, Boutcher, and others; these no doubt may succeed pretty well when made of shoots of one or two years' growth, but when older and of a large size they are apt to fail. The seed should be gathered in autumn, as soon as the scales of the catkins begin to open, which indicates their maturity, and may be separated from them by spreading them upon a sheet in a dry room and frequently turning them over; some sow the seed in autumn, but as the young plants are apt to be thrown out by the frosts in early spring, this had better be deferred till the month of March; the seed beds should be composed of fine earth, and the covering very light, not exceeding a quarter of an inch in thickness. In five or six weeks the young plants appear, and by the end of the summer they will have

attained a height of from four to six inches; in the following spring they may be run into nursery rows, from whence, in the course of a year or two, they will be fit to transfer to their permanent stations.

The insects which feed upon the Alder are very numerous: among the coleoptera, we may particularize the larva of the *Callidium alni*, a handsome longicorn beetle, that feeds upon the living wood, making long galleries in the heart of young trees; the *Clytus arietis* is also found upon it. In some districts the larva of *Adimonia alni*, and a small species of jumping weevil are also common, as well as *Phyllobius alni*, another of the weevil tribe. Among the lepidopterous insects, we have found *Notodonta dromedarius*, *Lophopteryx camelina*, *Acronycta psi*, *Geometra ulmaria*, besides several of the smaller species belonging to the *Tortricidæ* and *Tineidæ*.



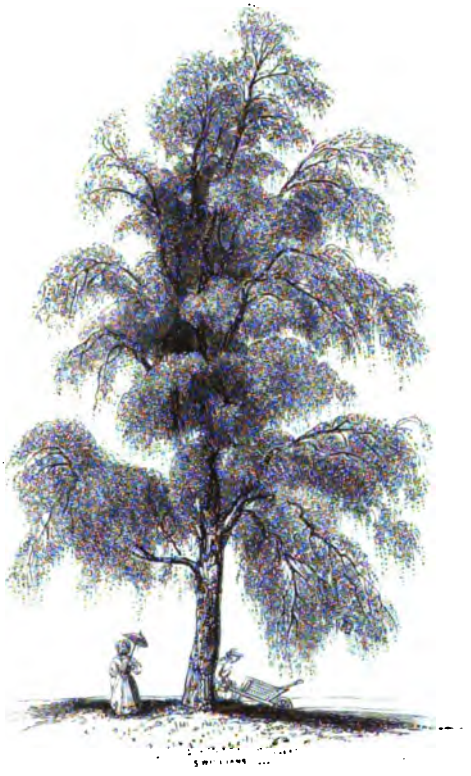


CUT-LEAVED ALDER.

Among the varieties of the Alder, the *Al. g. laciniata*, Cut-leaved Alder, forms one of the finest and handsomest, growing with great vigour, and attaining a magnitude fully equal to that of the species; most of the trees recorded by Loudon, (some of which are stated to be upwards of seventy feet high,) belong to this variety, and as it bears a foreign and uncommon aspect and is not

met with in a wild state in Britain, it may with propriety be introduced in artificial scenery, where a plant so common as the indigenous Alder would be quite out of place.





Genus *Betula*, TOURN.

LINN. *Syst. Monœcia Polyandria.*

Betula alba, LINN.

WHITE, OR COMMON BIRCH.

Betula alba,

LINN. syst. pl. 1393.
SMITH's Flor. Brit. 1012. Id. Eng. Flor. iv. p. 153.
HOOKER's Flor. Scot. 274. Id. Brit. Flor. ii. p. 411.
LOUDON's Arb. Brit. ch. civ. p. 1691.

The specific characters of this tree are thus stated in the English Flora; leaves ovate, acute, somewhat deltoid, unequally serrated, and nearly smooth.

This light, elegant, and airy tree, one of the chief ornaments of our wild and mountainous scenery, is too well known to require any particular or detailed technical description. Throughout Britain and Ireland it is found almost universally distributed in all hilly districts, as



well as upon commons and wild tracts, where the soil is poor or of a light and sandy quality. In Scotland it grows at an altitude of three thousand five hundred feet, being a higher zone than that attained by any other of our indigenous trees; but, as might be expected, at this height it is only met with as a low tree or bush. Its geographical distribution in other parts of the world is also very extensive. Throughout the warm and temperate parts of Europe it inhabits all the lofty mountain-

ous districts, at altitudes varying according to their respective latitudes or temperatures; thus, in the Apennines, it commences at a height of about four thousand seven hundred and sixty feet above the level of the sea, and reaches an altitude of six thousand feet. In Lapland the line of the Birch is one thousand nine hundred and



thirty-seven feet below that of eternal snow, and eight hundred and two feet above that of the *Pinus sylvestris*. In Russia immense tracts of country are covered with this timber alone, and Loudon remarks; that in the neighbourhood of Moscow it forms the prevailing tree in all the woods and pleasure-grounds belonging to the Russian nobility. It abounds in Sweden and Norway, is also

found in Iceland, and in fact its limits in Europe may be said to be bounded only by vegetation itself. In Asia also it holds a wide domain, inhabiting Siberia as far as the Altaic mountains, and appearing also in the far distant Himalayas. In North America Loudon supposes that it appears in the form of *Bet. populifolia*, though botanists consider that tree to be a distinct species; if, however, plants of *Bet. populifolia* are frequently raised from the seed of the common Birch, *Bet. alba*, as Loudon affirms to be the case, their identity, in our opinion, is proved by so convincing a fact. The most beautiful form of the Birch is that of the pendulous or weeping variety, or, as some call it, variation, which prevails in the highlands of Scotland and mountainous parts of Wales. It generally grows with greater rapidity, and attains a larger size than the common sort; on this account, as well as for its superior beauty, its seed is always collected by the nurserymen in preference to that of the other, so that purchasers are now almost certain of obtaining plants of this improved and superior kind.

Sir T. Dick Lauder has made a remark, which does not appear to have been noticed by other writers, "that in young Weeping Birches, there is a certain degree of roughness on the spray, as if it were the coagulation of a gum exuded from the pores, that never failed to indicate to us the tree which was ultimately to turn out of the pendulous variety." This we have long observed in regard to the plants purchased from the nurseries, and the result has almost invariably proved as Sir T. D. Lauder describes it. This exudation also exists, but in an inferior degree, in *Bet. populifolia*, another indication, we think, of its common origin with the *Bet. alba*;

and we have likewise observed it, though sparingly, upon the young shoots of *Bet. nigra* and *Bet. papyracea*.

In general estimation, as well as in the writings of many arboriculturists, the Birch is usually considered as a tree of a very inferior grade, almost worthless as timber,* and fit only to be grown upon land of too poor a quality to produce wood of a superior kind. Allowing its inferiority to several of our forest-trees, we think its useful properties are greatly underrated, and that, treated with a portion of that care and attention bestowed upon other species, it is equally if not better qualified to make a profitable return to the planter, than many trees we have been accustomed to admit into our mixed plantations. As a nurse or secondary to other trees, more particularly to the oak,† it is, with the exception of the larch, and perhaps upon good land of the gean, or wild cherry (*Cerasus sylvestris*), one of the best that can be used, as it not only occupies less room from its upright and semifastigiate growth, but from the smallness and lightness of its leaves, and the delicate nature of its spray, it is less liable to injure the trees it is designed to nurse and protect, either by overshadowing, or by lashing them in violent winds, than many other kinds that have been more freely introduced into mixed plantations, such as the wych-elm, the ash, the beech, &c.

The profit or return it affords in the way of thinnings, is also, in many situations, quite equal to, or even superior to that afforded by many other kinds of hard wood, as it becomes fit for certain uses some years before the others

* Evelyn speaks of it as the worst of timber.

† The Birch was extensively used as a nurse to the oak in the Duke of Portland's extensive plantations in Nottinghamshire.

have attained the size required, its growth being rapid, even upon inferior soils, especially where plants, reared from seed of the pendulous kind have been selected. Thus, for staves for herring and other fish barrels, the demand for which is now so extensive throughout Scotland and the north of England, the Birch attains a sufficient size in fifteen, or at most in twenty years, whereas the elm, the ash, and others, require several additional years to reach an equal diameter.

Upon a poor weak surface soil, but where the substratum is of a stiff clayey nature, and fit for the oak, we have found a mixture of larch, birch, and oak, the last intended to remain as the ultimate crop, to be the best and most profitable selection. In such a combination, the larch, which are planted in much greater numbers than either the birch or the oak, afford the first two or three thinnings, or until the birch have attained a profitable size, which they will do in eighteen or twenty years; the thinnings after this period may be either of the two kinds conjointly, or entirely of the birch, should the remaining larch promise to attain a large scantling; but should the latter show any inclination to taint or rot at heart, which it sometimes does at the age of fifteen or twenty years upon land of this quality, in that case it should form the whole of the thinnings until entirely exhausted, leaving the birch to be thinned out afterwards as the oaks require additional room. In plantations where the sweet chesnut is intended to form the principal crop, we believe that the larch and birch would prove the most eligible nurses. Upon poor light moist soils, mixed with the larch and the Scotch fir, it also proves the most profitable tree we can grow, and from its hardy nature, and rapid growth upon very

inferior soils, it ought to be freely introduced in belts and narrow plantations intended for shelter or breakwinds in open exposed districts.

As an ornamental tree in landscape gardening, the Birch is one of the most beautiful we possess, exhibiting a grace and elegance in its form and foliage that, if equalled, is not surpassed by any other of our indigenous trees, being, as Coleridge expresses it,

> ——————" most beautiful
> Of forest-trees, the Lady of the Woods."

Its introduction, however, into lawns and ornamental grounds ought to be regulated by the situation and circumstances of the place, for we agree with Loudon, that there are certain associations connected with this, and indeed with many other indigenous trees, where such happen to be the prevailing growth of the country, that are unfavourable to their use in artificial, or as he terms it "gardenesque" scenery: thus, it would be inconsistent and contrary to sound principles of taste, or rather, we should say, to the associations attached to this tree in its native habitats, to plant it upon lawns in the Highlands of Scotland, or in any districts where it is indigenous or the prevalent tree; though, as he observes, "in the neighbourhood of London, and many other parts of England, it may justly be admitted, even on lawns, as one of the most elegant of our ornamental trees."

In the romantic scenery of Scotland, the Weeping Birch forms one of its most beautiful and bewitching features; oft have we admired its graceful form, in the well-known pass of Killicrankie, on the shores of Loch Awe, the banks of the Spey, the Dee, and various other well-remembered

scenes, and oft have we, when thus enjoying our escape from our lowland home, been reminded of that passage in the " Isle of Palms," where

> ——————————— on the green slope
> Of a romantic glen we sat us down,
> Amid the fragrance of the yellow broom,
> While o'er our heads the weeping birch tree streamed
> Its branches, circling like a fountain shower.

The fragrance of the Birch is also an additional recommendation that it possesses; this it gives out at all times when in leaf, but more particularly in spring, when the leaves first expand, or after rain and heavy dews: and we cordially agree with Sir T. D. Lauder, that a few Birch trees should always be planted near a house, if it be only for the fragrance they emit.

As a wood the Birch may be deemed of a secondary quality; for, though under cover and protected from damp, its durability is considerable, it very speedily rots and decays when in contact with the earth. Its grain is rather coarse, but has a satiny texture, and its colour white, mixed or shaded with red. A vast quantity of Birch timber is annually cut up for the staves of herring barrels; and indeed this is the principal use to which it is now applied in the north of England and Scotland, except in some parts of the Highlands, where it is still the timber used in the construction of houses, and where not only the greater part of the household furniture, but also of agricultural implements are made of it. It is also used, together with the wood of the alder, for the soles of clogs, a kind of shoe much worn during winter by agricultural labourers in the north of England and Scotland.

Upon the Continent the wood of the Birch is more

highly appreciated, and applied to a greater variety of uses than in Britain. In parts of France it forms the felloes of wheels, and in Russia is converted to this and many other purposes. In Sweden, and other northern countries, it is made into furniture, but for this it must be of a great age, otherwise it warps, and is liable to the attack of the worm. In all these northern parts it is a tree of inestimable value to the inhabitants, as, in addition to the uses already stated, it affords one of the best and most ardent fuels, and in Sweden is that most generally used for the iron-smelting furnaces; the outer bark, also, which may be termed imperishable, (as it remains uncorrupted for ages,*) is used instead of tiles or slabs as a covering for houses, and so completely does it resist decay, that the Norwegians generally cover their bark roofs to the depth of a foot or more with earth: it also makes a coping for walls and other erections where protection from moisture is required; and, being very inflammable, is used instead of candles. By the Laplanders the bark is made into baskets, neat compact boxes, mats, as well as cordage for harnessing their reindeer; of it they also make their water-proof boots and shoes; the legs of the boots being taken entire from the trees, and therefore without any seam, and a piece of it with a hole cut so as to admit the head, forms an impenetrable cloak, or cape, in wet weather. From the leaves and young shoots a good yellow dye is obtained; but to enter into all the uses mentioned by authors to which the various parts of the Birch are applied, would occupy more space than we can afford.

* In the "Nov. du Hamel," we are informed that in the ruins of Dworotrkoi in Siberia, a piece of Birch wood was found changed into stone, while the epidermis, white and shining, remained in its natural state.

In England, when grown in artificial plantations, it is generally treated as a coppice-wood or undergrowth, and is cut down at the age of five or six years for brooms, hoops, crate ware, &c., or at the age of ten or twelve for fagot wood, poles, and small fencing. In Scotland, at the age of fifteen or twenty, it is fit for herring-casks, and when a fall takes place the trees are barked, and the produce sold to the tanners at about half the price of oak bark. The charcoal made from the Birch is excellent, and is extensively used in the manufacture of gunpowder, and it forms a fine crayon for the artist. From the sap obtained by tapping the tree in early spring a refreshing and wholesome beverage may be manufactured; upon which subject Evelyn is very diffuse, but our readers will obtain all the information requisite for the making of it in a much shorter recipe contained in the "Arboretum Britannicum." In Russia, the bark is subjected to distillation, and an oil is obtained, which is employed in the tanning of hides, and gives that powerful but not disagreeable scent peculiar to Russia leather, and which, when employed in the binding of books, is supposed to keep away the attacks of the *Ptinidæ* and other insects.

The Birch is now almost invariably raised from the seed, which ripens in September or October, and may either be sown as soon as gathered, or kept dry in some airy place during winter, and sown in spring: in the first case it vegetates early, but is sometimes apt to be cut off, or thrown out of the ground by frost; in the second it does not vegetate till May or June, but is then safe from any injury from the above-mentioned causes. The seed-bed should be composed of fine light rich mould, and when sown, the seeds, instead of being covered with earth, should be merely clapped down with the back of the

spade; and to defend them from winds and frosts if sown early, a little straw, pease-haulme, or other slight covering, may be thrown over them. In the following spring the seedlings may be drawn from the bed, and run into nursery rows, from whence they will be fit to transplant to their permanent stations in two years, or even in one, if small plants are preferred.

The Birch once planted requires very little attention or pruning, and indeed the knife should never be used except to remove a second or supernumerary leader. In districts where the Birch abounds, many seedlings annually spring up, and from this source nurseries when first established were almost entirely stocked, and some nurserymen are still supplied to a considerable extent in this way. It is asserted that these native seedlings root much better than plants taken out of a regular seed bed; but purchasers, we think, run a much greater risk of getting an inferior tree, than where care has been taken to select and gather seed from the finest specimens of the pendulous kind. The disease most common to the Birch shows itself in tufts or excrescences composed of small anastomosing twigs, upon the upper branches; these, when seen at a distance, resemble the nests of crows or other large birds. This disease seems to proceed from an extravasation of the sap, of the precise cause of which we are ignorant, though we think it more likely to originate from some contamination proceeding from the nature of the soil, than from the puncture of an insect. It is most prevalent upon ill-conditioned trees of the common sort, and though we have seen it affect them in a variety of soils, it is most common upon such as grow in that of a boggy or moorish nature.

Various insects and their larvæ feed upon the Birch; among the Lepidoptera we have found the caterpillars of

the following, in this district: of the Bombycidæ, *Leiocampa dictæa*, and *Lophopteryx camelina*; among the Noctuidæ, *Cosmia fulvago*; and of the Geometridæ, *Lampetia capreolaria*, *Lam. prosapiaria*, *Lam. defoliaria*, *Biston betularius*, *Cabera exanthemata*, as well as others belonging to the smaller moths. *Deporaus betulæ*, and *Rynchites betulæ*, belonging to the *Curculionidæ*, or weevil tribe, and which feed upon the leaves and buds, both in the larva and imago state, are among the coleopterous insects; the decaying stumps and trunks are the food of the *Rhagium inquisitor*, and *Leptura quadrifasciata*, beetles belonging to the *Cerambycidæ*, or longicorn division. The caterpillars of several *Tenthredinidæ*, or saw-flies, also feed upon Birch leaves; among these are *Cimbex femorata*, *Trichiosoma sylvaticum*, *Selandria betuleti*, and *Lyda betulæ*. Among the fungi which grow upon the decaying wood, we may notice the *Polyporus betulinus*, specimens of which we have often found eight or ten inches in diameter. The fleshy substance of the fungus, which is of a pure white, and of a corky or pith-like nature, when dried and cut into slices makes an excellent lining for insect boxes, and is also often used as a razor strop. The *Agaricus muscarius*, whose poisonous and extraordinary effects upon the system are described in a paper by Dr. Greville, contained in the fourth volume of the Wernerian Nat. Hist. Soc. Transactions, is also found in Birch woods.

Of the various American Birches none have yet been planted with a view to profit as timber trees, though several have for many years been cultivated for their ornamental qualities. Among these is the *Betula populifolia*, which Loudon supposes to be a variety of the common Birch; its foliage is handsome, but it does not attain the size of our native trees, and the wood is not superior in

quality. *Bet. papyracea* is another handsome species, and is the tree that affords the bark, of which the light canoes in North America are constructed. *Bet. nigra*, or the Red Birch of America, is another, but it appears to require a warmer summer than our own to bring it to maturity. *Bet. lenta*, from the superior quality of its wood, as well as its rapid growth and ornamental properties, well deserves the attention of our planters, and being a native of Canada, there is little doubt but that it would succeed and attain its full dimensions in most parts of Britain.



Nat. Ord. Corylaceæ.

Genus *Quercus*, LINN. LINN. *Syst. Monœcia Polyandria.*

THE OAK.

OF this numerous and most important genus, the various species of which are distributed throughout the temperate regions of the globe, Britain can only claim two as truly indigenous to her soil; these two, however, (if indeed specifically distinct,) are by far the most important of their kind, surpassing all other known species, not only in grandeur of form, bulk, and duration of life, but in the strength, durability, and general excellence of their timber, which for all purposes where these two qualities are essentially requisite, if equalled, at all events is not surpassed by that of any other European tree. Our navy attests its superiority in the construction of ships; while the sound and uncorrupted state in which it is found in buildings and other works of ancient date, is a proof of its general utility and fitness for every purpose where durability and strength is required. The rest of the Oaks, evergreen as well as deciduous, amounting, we believe, to upwards of one hundred and fifty botanical species, are all of exotic origin, and are distributed in the various regions of the globe either where these are rendered temperate by their latitudinal position, or in tropical climates by their elevation.

Of the European deciduous species, the next in rank

to the common Oak, in point of magnitude and other properties, is the *Quercus cerris*, Turkey Oak. This tree we are disposed to admit within the limits of our volume, not only on account of its ornamental qualities, which are considerable, but from a wish, if possible, to encourage its culture on an extended scale; being convinced, from the observations we have made, that it is a tree better calculated, from its rapid growth, and the nature of its timber, to repay the planter, than many others we are in the habit of introducing into our mixed plantations.

Of the evergreen or Ilex division, the common evergreen Oak, *Quer. Ilex*, a native of the southern parts of Europe, is the only one that has been planted to any extent, or that seems able to bear the vicissitudes of our climate, and to attain the dimensions of a second-rate tree. Its culture, however, is likely to be always restricted to ornamental purposes, as it is of too slow a growth and inferior a size to make it an object of profitable speculation to the planter; and its wood, though hard and durable, is very liable to split and crack in drying.

Of the various North-American Oaks, many are distinguished for the beauty of their foliage, particularly those whose leaves in Autumn become of a rich red, or scarlet tint; their timber, however, is open in texture, and generally very inferior to that of our own species, or even to that of *Quer. cerris*, with the exception of *Quer. alba* and *Quer. virens*, two species highly valued for naval purposes in America, but neither of which are likely to succeed in this climate; the introduction, therefore, of the American Oaks, is likely to continue on a limited scale, and more for the variety and ornament their foliage produces in our pleasure-grounds, than from any expectation of profit from the timber they produce.

In addition to the hard and durable quality of the wood of many members of this genus, the bark of all the species contains a large proportion of tannin and gallic acid, and is more extensively used in the manufacture of leather than that of any other tree; the bark of *Quer. tinctoria* also affords a very valuable yellow dye, and the oak-galls which are produced by the puncture of certain insects, and are a receptacle for their eggs and larvæ, form an extensive article of commerce, and besides being the chief ingredient in the manufacture of ink, are much used for dying black. From the *Coccus Ilicis*, or *Kermes*, a small hemipterous insect that infests a species of the Oak, a fine scarlet dye is obtained, which appears to have been known from a very remote period; the use of this insect has, however, of late years, given place to the cochineal, another member of the same family, inhabiting South America, where it is found upon certain species of Cactus.

The acorns, also, of the Oaks, besides forming an important portion of the food of various animals and birds, are many of them edible, and a wholesome human food. In Spain they are extensively consumed as a fruit, and we have tasted of some from that country equal, if not superior in flavour to the finest chesnuts. The species which produce the finest edible acorns are said to be the *Quer. ballota*, *Quer. esculus*, and *Quer. Grammuntia*, of botanists and the catalogues, all belonging to the evergreen section.*

* According to the author of "Sketches in Spain," the *Encina* of that country, which bears such delicious and highly-prized acorns, is identical with the *Q. Grammuntia* of authors; it further appears that this species prevails throughout the greater part of the Peninsula, and is the natural growth of the soil. It is, therefore, to be regretted that a more appropriate name had not been given to it, as it no longer exists in the locality from whence it took the appellation, and where, in all probability, it had been planted; the wood at Grammont, near Montpellier, we believe, being no longer in existence.

By many modern botanists, our common Oak, the *Quercus Robur* of Linnæus, is supposed to include two distinct species, distinguished from each other by the following characters: the one with the acorns supported on short stems, or as it is termed pedunculated, and the leaves subsessile or with very short petioles, the other with the fruit sessile, but the leaves petiolated: to the first, which is the prevailing kind in Britain, and which we may term the common Oak, they give the title of *Quer. pedunculata;* to the second, which is also met with in many parts, and is frequently found growing commingled with the other kind, that of *Sessiliflora.*

Of this specific division we speak with diffidence, as it is supported by the authority of various eminent botanists, who are more competent than ourselves to determine what constitutes a species. Our own impression, however, is, that they are rather to be considered varieties than species, and this supposition, we think, is strengthened by the fact that intermediate forms,* both in regard to the position of the fruit and the form of the leaves, are frequently met with, and these are found to run so much into each other, and sometimes to partake so equally of the characters of both kinds, as to render it difficult to determine to which they show the greatest affinity, thus connecting, by gradual approaches, the two supposed species, however distinct each may appear when viewed in its typical form, or where the variation is at its maximum. We may add, that in the general form, outline, and dimensions of the two trees when arrived at maturity, no striking or marked difference is perceptible, and though the quality of the timber of the sessile-flowering kind

* See Rev. W. T. Bree's communications and list of specimens in vol. xii. p. 571 of "Gardener's Mag." and "Arb. Brit." p. 1738.

is said to be inferior in strength and durability to that of the *pedunculated*, it is used indiscriminately with the latter by workmen for all purposes to which Oak timber is applicable, and even in ship-building the one is used in common with the other.

In treating of the British Oaks, we shall, in accordance with the views of botanical authors, give the distinguishing characters of the two supposed species under their appropriate titles, with such cursory remarks as may apply to them individually, after which we shall proceed to such observations as are equally applicable to both kinds, their general and statistical history being so closely interwoven as to render any attempt at separation in this respect almost impossible.





Quercus (robur) pedunculata. WILLD.

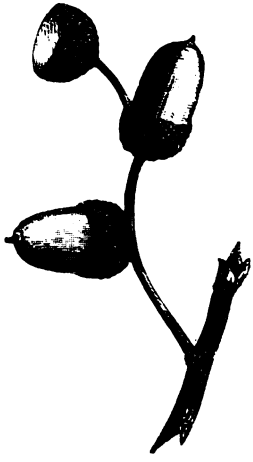
PEDUNCLED, OR COMMON OAK.

Quercus pedunculata,	WILLD. sp. pl. No. 65.
	LOUDON'S Arb. Brit. part III. ch. cv. p. 1731.
Quercus robur,	LINN. sp. pl. p. 1414.
	SMITH'S Br. Flor. 1026. Id. Eng. Flor. iv. p. 148.
Quercus robur pedunculatum,	MARTYN'S Flor. Rus. x.

LEAVES deciduous, oblong, smooth, dilated upwards, sessile, or with very short petioles, the lobes obtuse, with rather acute sinuses, the stalks of the fruit elongated,

acorn oblong. Such are the botanical characters assigned to the peduncled Oak, taking it in its common typical form. It is subject, nevertheless, to vary, and undergo considerable modifications in the shape of the leaves, both as regards the depth of the sinuses and the number of the lobes, as well as in the existence or total want of a petiole; the form and size of the fruit, also, are dissimilar in different trees, and the fruit-stalks vary greatly in their length; in some instances being upwards of an inch long, in others very short, and nearly sessile, or intermediate, as it were, between what may be called the typical forms of *Quer. pedunculata* and *Quer. sessiliflora*, which has induced some to consider such instances as Hybrids, though the fact of their producing fertile seeds militates, we conceive, against such a supposition, and is rather in favour of the common origin of the two supposed species. A great difference is also observable in regard to the period of coming into leaf, and casting the foliage in autumn, some trees expand-





ing much earlier than others, though growing upon the same quality of soil and within a few yards of each other,* and many remain green long after others have assumed the autumnal russet tint, or entirely lost their leaves; differences of form are also observable, some preserving a round or globular head, others a more fastigiate and upright growth; in short, innumerable variations and modifications in all the particulars above-mentioned, may be observed in Oak woods of any considerable extent. Among the different varieties of the common Oak enumerated by authors, the *Quer. fastigiata* appears one of the most distinct and remarkable, resembling, in its general form and growth, the cypress, or the Lombardy poplar, and on this account is named by the French, *Chêne cyprès.* It is a native of the Pyrenees, where it was observed by Captain Cook, now Captain Widdrington, R. N., and is also met with in the Landes near Bordeaux, and in the Basse Navarre. The Pendulous Oak, of Moccas Court, Herefordshire, is another interesting variety, and we may remark, that most of the plants raised from the acorns of the parent tree partake, in a greater or less degree, of its weeping character. There is also a laciniated or Cut-leaved Oak, another with variegated leaves, and a third with leaves tinged with purple when they first expand, enumerated among the varieties of this tree, by Loudon, in the "Arboretum Britannicum."

* At Twizell, there is an instance of an Oak of this kind, *Quer. pedunculata*, that invariably comes into leaf nearly three weeks earlier than any of its neighbours. The Cadenham Oak, in the New Forest, annually expands a few leaves at Christmas.



Quercus (robur) sessiliflora. SALSB.

SESSILE-FRUITED OAK.

Quercus sessiliflora,	SALSB. prod. 392.
	SMITH's Flor. Brit. 1026. Id. Eng. Flor. iv. p. 150.
	LOUDON's Arb. Brit. part. III. ch. cv. p. 1786.
Quercus robur,	WILLD. No. 64.
Durmast Oak,	MARTYN's Flor. Rus.

THE distinguishing characters of this Oak, as given by Sir J. E. Smith, and other botanists, are, leaves on elongated foot-stalks, deciduous, smooth, and oblong, the sinuses opposite and rather acute, the lobes obtuse, the

fruit sessile, oblong. In other respects, as to general form and magnitude, it closely resembles the common Oak, indeed so much so, that, of the numerous trees recorded in various parts of Britain, for their enormous dimensions, age, and other peculiarities, the variety or species to which they belong, has, in many cases, never been mentioned or ascertained. According to some writers, the *Quer. sessiliflora*, is said



to have a more lofty and pyramidal growth than the *Quer. pedunculata;* but this, judging from the various specimens we have examined, the characteristic drawings of Mr. Strutt, and the excellent outlines of both kinds figured in the "Arboretum Britannicum," does not appear a character upon which much dependance can be placed. Loudon states his belief that no important or constant difference



exists between the mode of growth of the two kinds, "because," he observes, "we have found individuals of the one species, as pyramidal, fastigiate, or orbicular, as we have found any of the other;" and the Rev. W. T. Bree, who writes in the "Gardener's Magazine"* upon the *Quer. sessiliflora* and its varieties, remarks, that there

* "Gardener's Magazine," vol. xii. p. 571.

is little difference in the general form and outline of the two trees when full grown, at the same time he feels "that there is a certain indescribable something about the trees, by means of which he can always distinguish each, without examining either the acorns or leaf-stalks."

A close examination, we allow, of the two kinds, at least of trees where the peculiar characters of each are most distinctly developed, shows a difference, both in the naked tree and when clothed with leaves, that to the practised eye becomes appreciable and readily recognised; thus, we find that in *Quer. sessiliflora*, the growth of the spray, or branching, is freer and less tortuous than in *Quer. pedunculata*, that the leaf-buds are larger, and the bark in general much whiter in colour; the leaves, also, when expanded, are usually larger, and from the length of their petioles hang more loosely, and present a less tufted appearance than they do in *Quer. pedunculata*. In regard to the quality of the timber of *Quer. sessiliflora*, there are various opinions, some having considered it inferior, both in strength, toughness, and durability, to that of *Quer. pedunculata*, while others estimate their relative properties to be nearly upon a par; that the latter is the more correct opinion of the two appears to be established from the comparative trials and experiments that have been made, which show that in strength, elasticity, and toughness, the *Quer. sessiliflora* is fully equal if not superior to *Quer. pedunculata*, and were it not for the supposition of its inferior capability of withstanding the vicissitudes of dryness and moisture, that is, its more perishable nature between wind and water, it would be even superior to the *Quer. pedunculata* for ship-building.

A further proof that its wood is not generally considered of inferior quality to that of *Quer. pedunculata*,

is that the timber of both kinds has always been indiscriminately used for the most important purposes, such as ship-building, house-rafters, &c., which would scarcely have been the case had the produce of *Quer. sessiliflora* been known to be, and invariably found, of a quality inferior to that of *Quer. pedunculata*. Our own opinion is, that there is not any such material difference between the qualities of the timber of the two trees as has been asserted by some, but that inferior timber is occasionally produced by each variety,—the result, perhaps, of some original constitutional defect, or arising from the nature of the soil, situation, or other local peculiarities of the ground upon which the timber has been raised. Such, at least, is the result of our own experience, as we have met with oak of the *peduncled* kind, with timber possessing all the inferior qualities attributed to and supposed to be possessed exclusively by *Quer. sessiliflora*.

The grain of the wood of *Quer. sessiliflora* is generally less varied and of a more uniform and deeper colour than that of *Quer. pedunculata*, and with less of that laminated appearance which is called the *flash* or silver grain; and it is now ascertained that the timbers found in old houses, and other ancient buildings in different parts of the kingdom, and which were long considered to be formed of the wood of the sweet chesnut, are, in reality, composed of Oak, and mostly of the sessile-fruited kind. We are only surprised how such a belief ever obtained credit, considering that the chesnut does not appear to be of indigenous growth, that at no period has it prevailed in Britain as a forest tree, and indeed does not even appear to have grown at any time in many districts where house timbers of this description have been found.

The Durmast Oak of Martyn's "Flor. Rustica," the

Quer. sessiliflora var. B. of Smith's "Eng. Flor.," and by Loudon supposed to be the *Quer. pubescens* of Willdenow's *Abbildung*, seems merely a variety of the *Quer. sessiliflora*, where the deviation from the *Quer. pedunculata* is at its maximum. In this variety the leaves are less deeply cut, more numerously sinuated, with their under surface of a pale glaucous green, and when first excluded from the bud, covered with a hoary pubescence. It is found in the New Forest, where it is known by the above-mentioned name, and is also met with in other districts, but is far less common than the usual form of *Quer.*



sessiliflora. Of this well-marked variety there are two trees now growing in the grounds at Belford Hall, Northumberland, the seat of the Rev. Dixon B. Clark. From acorns gathered from these trees we have raised several plants, none of which yet resemble their parents in the appearance and colour of their foliage; but this may be

owing to their age, the largest of them not being more than six or seven years old.

We now proceed to such observations as apply to both the British Oaks, for as we have already observed, their statistics are too closely interwoven to allow of being separately treated, and what we have to say in regard to the culture, management, and properties of the one is equally applicable to the other.

The Oak is indigenous throughout Britain, and in former ages, before the clearing away of the forests had commenced, appears to have covered a very large portion of its surface, for even in districts where the natural or self-sown Oak is now rarely seen, the remains of noble and gigantic trees are frequently met with, sometimes in the alluvial deposits on the margins of our rivers, or in boggy places, covered with a layer of peat moss, which has been generated around them by the stagnation of the water caused by their fall. Examples of this kind are frequent in our own county (Northumberland), and we know of several trees of large dimensions that have been exhumed in tracts where, at the present day, scarcely an Oak of any great age, or that has attained one-fourth the size of those former denizens of the forest, is now to be met with. At Linden, the seat of Charles W. Bigge Esq., the trunk of a magnificent Oak was extracted from a peat moss, that fills a small basin or hollow, evidently produced by the stagnation of a stream which now passes through it, and which at some distant period had been dammed back by the fall of the trees upon its margins. This Oak was covered by a layer of the peat to the depth of about three feet, and was discovered by probing the moss. The trunk, with a small portion of one of the larger limbs, was with great labour and difficulty dragged from its miry bed. The

contents of the portion recovered contained five hundred and forty-five cubic feet, although the whole of the sap wood had perished.

The timber was perfectly sound, and the tree, by whatever accident it had been overthrown, had fallen in the vigour of its growth. When sawn up, the interior planks were found of a deep rich brown colour; those nearer the exterior darker, or approaching to black. A variety of elegant furniture has been made from the wood, but it has been found necessary for fine cabinet-work to have it cut into veneers, as, when worked in bulk, it is apt to crack and become warped. The remains of other large Oaks have also been met with upon the banks of the Tyne, the Alne, and other rivers, as well as in various bogs and morasses, and we mention these instances to show in a district where, at the present day, nothing but recently-planted Oak, or dwarfish timber from stock shoots exists, that in former times the monarch of the forest grew luxuriantly and attained a splendid developement, and also as an inducement to the planter not to neglect the liberal insertion of this national tree wherever soil and situation are found congenial to its growth. In other parts of England the Oak still grows in all its native magnificence of form and dimensions, and the remains of those ancient forests which are chronicled by our earliest writers, and which, in the time of our Saxon ancestors, spread over the greater portion of the country, are still to be traced in the venerable but living relics of enormous Oaks, many of which are supposed to number more than a thousand years.

To give a detailed account, or even to enumerate all the various Oaks remarkable for their size and other peculiarities, which have existed or do still exist, would

occupy more space than the limits of this work will allow; this circumstance, however, we regret the less, as it may induce the reader to turn to the interesting pages of the "*Amœnitates quernæ*," of the late Professor Burnet, in which work the historical facts, legends, &c., connected with the history of individual Oaks of ancient date, are amply discussed, to the magnificent "Sylva Britannica" of Strutt, or to the "Arboretum Britannicum," in which work, the counties being ranged alphabetically, an account is given of all the most celebrated Oaks that have existed or are now living in each of them. We shall, therefore, briefly mention a few of the largest Oaks on record, and afterwards point out others which, though in a state of decay, are still living, concluding our notice with such Oaks as are in a thriving or growing state, and which promise, in progress of time, to equal the dimensions of their most magnificent predecessors.

The solid trunk of a gigantic Oak is recorded by the Rev. Abraham de la Pryme, in the "Philosophical Transactions" for 1701; it was found beneath the level of Hatfield chase, in Yorkshire, by Mr. Edward Canby, and measured one hundred and twenty feet in length, was thirty-six feet in circumference at the butt end, thirty feet at the middle, and eighteen feet at the small end, where the trunk was broken off, so that by moderate computation, he adds, "this tree may have been two hundred and forty feet in height." Dr. Plott, in his history of Staffordshire, mentions an Oak at Rycote, under the shadow of whose boughs four thousand three hundred and seventy-four men could stand, and another at Norbury, forty-five feet in circumference. The Boddington Oak, in Gloucestershire, the remains of which were burnt down in 1790, was fifty-four feet in circumference at the base,

and Damory's Oak, in Dorsetshire, which was sold and cut up for firewood in 1755, was sixty-eight feet in circumference at the ground: both of these were hollow trees.

Of those still existing and remarkable for age and size, the Winfarthing Oak is said to have been an old tree at the time of the Conquest; Cowper's Oak, in Northamptonshire, is supposed to have been planted in the time of William the Conqueror; the Salcy Forest Oak, in the same county, boasts a much greater age, as it is supposed to have seen one thousand five hundred seasons, its trunk is forty-six feet in circumference; the Flitton Oak, in Devonshire, of the *sessiliflora* variety, supposed to be one thousand years old, is thirty-three feet in circumference at one foot from the ground; the Cowthorpe Oak, in Yorkshire, is seventy-eight feet at the ground; the Hempstead Oak, in Essex, fifty-three feet, and the Merton Oak, in Norfolk, sixty-three feet in circumference. In Scotland, also, the remains of magnificent Oaks still exist: amongst others may be particularized the Wallace Oak, at Ellerslie in Renfrewshire, amidst whose branches it is said the patriot and three hundred of his followers hid themselves from the English. At Lockwood, in Annandale, Dumfriesshire, the ancient seat of the Johnston family, we visited, about three years ago, the grove of Oaks which surrounds the remains of the ancient castle, and remarked one of still vigorous growth, with a circumference, a little above the ground, of sixteen feet. In the same county, during the tremendous hurricane of the 7th of January, 1839, a remarkable Oak called "the three brothers," so named from the three stems or limbs of which it was composed, was blown down, the solid contents of which were found to be five hundred and sixty-one feet eight inches.



In Roxburghshire, near Jedburgh, stands the King of the Woods, a beautiful Oak of vigorous growth, with a trunk forty-three feet in height, and a circumference of upwards of sixteen feet, and near to it the Capon tree, figured above, a short-stemmed but very wide-spreading Oak, with a circumference at the base of twenty-four feet, the legend attached to which is, that it served as a trysting place for the border clans in bygone times. These two trees are supposed to be the remains of the ancient forest of Jed. In Inverness-shire, at the head of Loch Gary, Sir T. Dick Lauder* found the remains of a prostrate Oak forest upon the surface of the solid ground, among which he measured one tree with a clean stem twenty-three feet in length, sixteen feet in circumference at the butt end, and eleven feet towards the smaller end under the fork; the wood, with the exception of an inch or two on the external part, appeared perfectly fresh, although it must

* Lauder's "Gilpin," p. 272.

have lain for many years in that situation, as a fine old birch wood grew upon the ground it had occupied; Sir T. D. Lauder adds, that the stock whereon this Oak had grown and close to which it lay, was worn away in the centre, and so hollowed out as to encircle a large and thriving self-sown birch tree of more than a foot in diameter.

Of Oaks, still in vigorous health and increasing in size, the Squitch bank Oak, in Bagot Park, Staffordshire, the seat of Lord Bagot, seems one of the largest, being upwards of forty-three feet in circumference at the base, and sixty-one feet high; its solid contents, a few years ago, were found to exceed one thousand and twelve feet. The Beggars' Oak, in the same Park, is also a fresh and vigorous tree, with a trunk upwards of twenty-seven feet in circumference at five feet from the ground; it contains eight hundred and seventy-seven cubic feet of timber, and Sir T. D. Lauder informs us would have produced, according to the price offered for it in 1812, 202*l.* 14*s.* 9*d.* At Hazelgrove, in Somersetshire, is a noble Oak, eighty feet in height, and which measures thirty feet in circumference at four feet from the ground; this tree contains eight hundred and sixty-three feet of timber. At Nettlecombe Court, in the same county, is another Oak, eighty-five feet high, seventeen in circumference near the ground, and which contains six hundred cubic feet of timber. The Woolton Oak, Buckinghamshire, possesses all the characteristics of a magnificent and picturesque tree, and by some is considered one of the finest in England, even surpassing, in characteristic beauty, the Chandos Oak, which grows in the same county, in the grounds of Michenden House; this tree is now in the highest health and vigour, and its wide-spreading, umbrageous

head covers a circle whose diameter is more than one hundred and eighteen feet. The great Panshanger Oak, in Herts, is another magnificent tree, of great beauty, and well balanced form, and though upwards of one hundred and fifty years old, is only approaching its prime; when last measured, it was found to contain more than one thousand feet of solid timber.

Innumerable other thriving specimens of Oaks might be instanced in various parts of the kingdom, as scarce a park exists that does not boast of vigorous trees, in different stages of growth, many of them promising to equal the finest specimens of recorded British Oaks, and which, there is little doubt, if allowed to attain their utmost longevity, will, at some far distant day, emulate the gigantic remains of those we now survey with admiration and astonishment.

At Hedgeley, in Northumberland, we lately saw an Oak thirty-seven years old, that had attained a circumference of five feet six inches about a foot above the ground. It is the produce of an acorn planted in the place where the tree stands.

During the Saxon rule and even for some time after the Conquest, Oak forests were chiefly valued for the fattening of swine, and in times of scarcity, acorns were not disdained as human food. Laws relating to pannage, or the fattening of hogs in the forest, were enacted during the heptarchy; and by King Ina's statutes, any person wantonly injuring or destroying an Oak tree, was mulcted in a fine, varying in extent according to its size, or the quantity of mast it produced, and we may further judge of the value attached, in those days, to this kind of produce, when we find that the pannage of two hundred hogs was deemed a fit portion for a princess, and that dona-

tions of monarchs to their retainers often consisted of the produce of a portion of Oak forest.

The durability and fitness of the Oak for naval purposes seems to have been appreciated from a very early period, and long before any records we possess, for in the "Journal of Science" (vol. i. p. 244) Sir Joseph Banks mentions the finding of an ancient canoe in Lincolnshire, in April 1816, at a depth of eight feet below the surface, when cutting a drain parallel with the river Witham, about two miles east of Lincoln,—it was hollowed out of an Oak tree, and measured thirty feet eight inches in length, and three broad in the widest part; several other canoes of a similar construction have been discovered in the same county and near to the same locality, and as vessels of a much superior build were in use, long before the time of Alfred, a very ancient, and in all likelihood a date anterior to the invasion of the Romans, may pretty confidently be assigned to these primitive vessels which, as Professor Burnet observes, "are only found amongst the rudest people and in the earliest stages of society." In the time of the Saxons, their numerous ships, or rather oared galleys, were built of Oak; and after the Conquest, the British navy was fostered with great care, and as early as A. D. 1214, in the reign of King John, the right of England to the dominion of the seas was proclaimed. It was not, however, till the time of Henry the Seventh that three-masted vessels, or ships approaching in magnitude and form to our present men-of-war, were built, although cannon had been used aboard ships as early as 1380.

Oak timber was also used almost exclusively for all building and carpentry purposes; the timbers of the oldest buildings are uniformly of Oak; it formed the roofing, as well as the interior decorations, of our ancient churches

and cathedrals, as we see it exhibited in the beautiful tabernacled stalls of that of Gloucester, in the shrine of Edward the Confessor in Westminster Abbey, and in various other ancient edifices. It roofed our old baronial castles and halls, and also panelled their rooms of entertainment; and the massive tables and other household furniture with which they were provided, were generally fabricated of the same durable material. It was also used from the earliest period in all exterior works where strength and durability were required, such as piles to strengthen and secure foundations of buildings, bridges, &c.; and its durability and almost imperishable nature for water-works is proved by the sound condition, in which it has been found after the lapse of ages, in one instance, viz., that of the stakes driven into the bed of the Thames to prevent the approach and landing of Julius Cæsar, of nearly two thousand years.

The decrease of the Oak forests in Britain was, for long after the Conquest, very gradual, as in Henry the Second's time the greater part of England appears to have been covered with wood, consisting principally of Oak, and about that period London was surrounded by a large forest, "in the coverts whereof (so says Fitzstephen) lurked bucks and does, wild boars, and bulls;" and even so late as the reign of Henry the Seventh, Polydore Virgil informs us that the forests covered nearly one third of all England. It appears, however, soon after this period, in consequence, we may presume, of the increasing population, the advance of civilisation, and the greater demand for agricultural produce, and perhaps, also, by a partial relaxation of the severe forest laws in regard to the preservation of game, the axe, and other means of destruction must have been freely applied, as it was deemed necessary,

in the reign of his successor, to enact a law enjoining the replantation of forest-trees, and in the 13th of Elizabeth further enactments were required for the preservation of the royal woods. These suffered again most severely during the civil wars, and so great was the destruction of the Oak, during these unsettled times, that serious apprehensions of a failure of timber for the support of the navy, began to be entertained in the succeeding reigns; and in that of William the Third a statute was passed, empowering commissioners to enclose at once two thousand acres of the New Forest, and to add annually two hundred more for the space of twenty years; since then, the national woods have been more strictly looked after, and a breadth of land to the extent, we believe, of fifty thousand acres, is now planted, and as an improved system of management has been adopted, we may hope that it will to a certain extent answer the intentions proposed by the legislature.

It is not, however, to the royal forests we are to look for the principal supply of our naval timber, but to the encouragement given to planting by the remuneration private proprietors reap from the cultivation of the Oak;* and though its value may be lessened, as compared with what it produced during the period of the late war, when Oak bark had risen to an enormous price, in some years having amounted to fourteen, sixteen, and even eighteen pounds per ton, still the present price of Oak timber, for ship-building, and for which the demand seems annually increasing, is sufficiently encouraging, (low as now may be the comparative value of the bark,) to induce any one who plants to introduce a due proportion of this valuable tree.

There may, perhaps, be some who suppose, from the

* Ten Oak trees were sold by Sir George Cornwale, Worcestershire, for 1100*l.*

slower growth of the Oak, and the length of time it requires to attain maturity and size to qualify it for ship-timber, that they are likely to gain more and within a shorter period, by plantations composed of other trees without any admixture of Oak. Such an opinion we conceive to be erroneous, at least with respect to all soils in which this tree will thrive, for we believe that greater advantages and equal profit may be obtained from mixed plantations, in which the Oak has been introduced in sufficient quantity to stand as an ultimate crop, for the number of plants required for this purpose, and the room they occupy when quite young and for many years afterwards, is not such as to lessen materially the value of the necessary and periodical thinnings of the other occupants which have been planted as nurses or rather secondaries, and, after these are all cut out, a crop of valuable wood is left, which, although it may not arrive at maturity during the planter's life, greatly adds to the value of his property. But the Oak, though it requires a greater length of time to render it fit for naval and other purposes requiring a large scantling and sound heart-wood than our other forest-trees, is not of so slow a growth as many seem inclined to suppose, for it is found that its rate of increase, when planted in favourable soil and situation, and after it is once fairly established, is from one inch to one inch and three quarters in circumference annually, for nearly the first century, and that it has frequently been known to contain a ton of timber at the age of seventy; after this period, and until it attains its full maturity, or begins to decay, its annual increase in circumference is not so great, though its solid contents may be increasing faster, inasmuch as the square enlarges more rapidly by a smaller addition to the increasing diameter.

As compared with the larch, the Scotch fir, and others of the pine tribe, or with the rapid-growing poplars and willows, the growth of the Oak during youth is undoubtedly much slower, being only at one third the rate of that of the white poplar, and even less of that of the black Italian poplar; the difference, however, in respect to the ash, the elm, the beech, and some other forest-trees, is not nearly so great, as we find from Vancouver's observations in Hampshire that the relative increase of various trees in that county, taking them at ten years old, and fixing the Oak as a standard, was as follows; Oak ten, Elm sixteen, Ash eighteen, and Beech twenty. In our own plantations, which are of considerable extent, and upon which great care and attention has been bestowed in regard to timely thinning, &c., the difference in the rate of growth of the Oak, in respect to the ash, wych elm, sycamore, beech, &c., is not so great as above stated; indeed in some parts where the soil is particularly suitable to the Oak, now that the trees have attained the age of twenty-eight or thirty years, it is very trifling, and scarcely perceptible, and we find that at this age, in consequence of having planted the Oak in a larger proportion per acre than can stand permanently, the thinnings of this tree pay better than those of any other occupant except the larch, as they are of size sufficient to cut up into staves and other purposes to which the thinnings of the other kinds of hard wood at this age are applied, at the same time that the value of the bark, even at its present reduced price, more than repays the whole cost of cutting down and converting to use.

At twenty-eight years' growth we have several Oaks three feet in circumference at eighteen inches from the ground, a great number two feet four inches, and the

average of the remainder from sixteen to eighteen inches; within the same period, the growth of the larch, taking the medium size, is three feet nine inches at eighteen inches above the ground, the spruce fir nearly four feet, the Scotch fir three feet eight inches, the wych elm from two feet seven inches to three feet, the beech from two feet nine inches to three feet, the sycamore from two feet six inches to three feet, the black Italian poplar of twenty-two and twenty-four years old upwards of five feet, the *Salix alba* nearly the same.

Although the Oak will grow in a great variety of soils, and produces valuable timber upon such as seem of very opposite quality, it is generally acknowledged and allowed that it flourishes in the greatest perfection, and produces the best timber upon such as are of a strong adhesive nature, or are known under the term of clayey loams, or good clay soils, more particularly where the substratum is of this description, and of considerable depth, for as it sends down its roots much deeper than most other forest-trees, it derives its chief nutriment from the lower strata, and is not dependent as they are upon the nature of the surface soil. On this account we must not judge of the fitness of the soil for the growth of Oak, by the appearance or quality of the upper stratum, for it frequently happens that extensive districts, where the surface soil is of so poor and inferior a quality as scarcely to repay the cost of cultivation, are nevertheless, from their strong clayey substrata, well adapted to the growth of Oak: such is the case upon many moorish tracts and wastes, where a poor thin surface soil is succeeded by a deep stiff loam, or where the surface is of a poor tilly and gravelly nature, but with a strong clayey substratum. Upon the cold clayey tracts of the north of England and Scotland,

which unless subjected to the process of furrow draining, are scarce worth cultivating, the Oak grows vigorously, and with every promise of obtaining a valuable scantling; we have Oaks growing upon land of this description, which look as healthy and promise as fairly, as almost any we have planted upon what we consider the best of our woodland soil, and we can form some opinion of what the nature of the timber is likely to be when matured by age, from the quality and quantity of sound heart-wood the thinnings now show at the age of thirty years.

In preparing clay lands of this description for planting, the great object is to get them effectually surface-drained, so that after heavy drenching rains the superabundant moisture may be rapidly carried off, and not allowed to stagnate, and thus sour the ground, reducing it in wet seasons to the state of mortar, and afterwards leaving it, when desiccated by long-continued drought, as hard and impervious as a half-burnt brick. This must be effected by numerous open cuts, taking advantage of the hang or fall of the ground, and so disposed as to discharge their contents into one or more main drains, to carry the water entirely off; these open drains ought to be two spadings deep, about three feet wide at the top, and shelving gradually to the bottom, the cost of casting out which may amount to 2*d.* per rood.

We speak from experience of the advantage, indeed the necessity of effectually surface-draining land of this description previously to the insertion of the trees, for having planted about eight acres of a stiff clayey soil, with little fall but with no appearance of springs or bottom water, we found at the end of four years that the plants had scarcely made any progress, indeed that many had died, their roots having perished, either from the

constant saturation of the earth during long-continued rains, or else from having been desiccated and bound up in an impenetrable brick-like mass by the spring and summer droughts. In the autumn of the fifth year we had this plantation thoroughly intersected by open drains, and at the end of the succeeding summer the effect was visible and striking; the whole of the plants which, during the previous year, had presented a sickly, dying aspect, had already, in most instances, made tolerable shoots, and had acquired a healthy colour, at the same time that the soil had become loose and friable, and the surface which previously presented nothing to the eye but patches of *carex recurva*, and a few scattered tufts of *lotus corniculatus*, had become thickly covered with herbage. Up to the present time, now three years since the drains were cut, the progress of the trees has been as rapid as we could wish or expect, and the earth is now loose and friable, and of a texture very dissimilar to what it exhibited when saturated with moisture and undrained.

The Oak is propagated entirely by acorns, which are either sown at once in the place where the plants are to remain, or else in nurseries where, after being transplanted from the seed-beds, they are allowed to stand for two or three years, or until they acquire sufficient size and strength to suit the views of different purchasers. Each mode of propagation has its advocates and admirers, and much has been said and written by both parties in favour and defence of their respective opinions. The acorn planter pleads for his system that it appears to be more in accordance with the common course of nature, at the same time imagining that the preservation of the early tap root of the seedling is essential to the future developement of the tree; on the contrary, the favourer of the

plant system is satisfied that the cutting off the lower portion of the tap root at an early age, neither greatly retards the growth nor interferes in the slightest degree with the after developement of the plant, added to which he maintains this important consideration, that an Oak wood may be raised by the plant system at much less cost, and with greater certainty of success than by the former method.

After having made trial of both modes of propagation, and watched the progress of the Oak under each system for the last thirty years, we have no hesitation in giving a decided preference to plants over acorns, being convinced in planting upon an extensive scale, and where rapid growth and profit are the principal objects in view, that Oak woods may be raised by the plant system at less cost, and with a greater certainty of producing eventually, timber of as large a scantling and as excellent in quality, as by sowing the acorns where the trees are to stand.

The supposition that cutting off any portion of the tap root of the young Oak must be prejudicial to its growth, or that the tree continues to draw its chief support and nourishment during the many centuries it exists, through its medium, are both of them equally erroneous. It is a well-known fact that in seedling Oaks and other tap-rooted trees, the loss of the lower portion that may be cut off is soon supplied by the reproduction of one or more downward leading roots, as well as that the emission of the lateral roots which, after a limited time, or as soon as they have taken firm hold of the ground, undertake the duty of support, is thereby encouraged; and as Mr. Loudon observes, "it is also well-known that the tap root is only found in the Oak and

other trees when in a young state,* and that no Oak or other tree, when cut down or uprooted, was ever found to have anything like a perpendicular descending main root, in any way commensurate to the perpendicularly ascending trunk of the tree, above ground."

The tap root of the young Oak, like that of the walnut, and many other trees, only supports the plant during infancy, or for a limited time, which may vary according to the circumstances of soil, situation, and climate, but so soon as the lateral roots are emitted, and become large enough to undertake the support of the tree, from that time Mr. Davis, whose observations on this subject are well worth perusal,† remarks, " the tap root ceases to be useful and at no distant period ceases to increase, and is very soon not distinguishable from the other roots :" he afterwards arrives at the conclusion, " that not only will an Oak sapling or seedling from three to five years old, planted out with the tap root cut off, again root downwards, sometimes singly, sometimes forked," but that the practice of cutting off the tap root gives the plant new vigour, and enables it after a few years to exceed in growth the native tree, and further that large Oak trees, whether native or transplanted, long before they become fit for naval or other purposes, lose their tap roots altogether.

But, supposing the advantages, in respect to early growth, increased scantling, &c., of the two modes of propagation to be upon a par, or even somewhat in favour of the native plant, still we hold that in extensive planting operations,

* This is the case with several of the pine tribe, which when quite young have large tap roots, as any one may ascertain by examining seedlings of the pinaster, and stone-pines. These cease to elongate as soon as the lateral roots which, in most species run near the surface, acquire sufficient size to nourish the tree and have taken firm hold of the ground.

† " Bath Soc. Papers," vol. xv. p. 51.

more particularly in the north of England and Scotland, the cost of the acorn system would considerably exceed that where plants are used, and without ensuring the same certainty of success of a requisite number of trees; for, it must not be forgotten, that nearly the same labour and expence would be required to prepare the holes for the reception of the acorns, as would suffice to plant young trees by pitting, and much more, where this is effected by slitting in, a mode of planting that may be successfully used with small-sized plants, and which we would recommend where the soil is of a clayey retentive nature; but the expence of the acorn system does not end with the mere committal of the seed to the earth, the seedlings must be inspected and taken care of for two or three years afterwards, kept clean of weeds, and the supernumeraries thinned out, all of which operations are attended with considerable expence; added to this, it often happens that the greater part of the seed sown fails to vegetate, or is destroyed by vermin,* or other casualties, in which case, a similar expence for seed, planting, &c., must again be incurred, and, what is of still greater importance to the planter, the loss of the growth of several years. Acorns, also, it must be recollected, though frequently to be procured in plenty and at a cheap rate in many of the southern and midland counties, are costly in comparison when imported into the north of England and Scotland, and, as the crop is uncertain, they cannot be procured every season, whereas the nurseries are rarely without an abundant supply of young trees.

By the plant system, where common attention is paid to the operation, a regular crop of young trees, disposed at such distances as may suit the fancy and views of each

* See Billington's Planting, from page 37 to page 47.

respective planter, is at once secured, with the additional advantage of gaining from three to five years in advance of native plants, for, even should it be thought advantageous, as many do, to cut close over by the surface all such trees as at the end of the first or second season after insertion have made little or no progress, or which look stunted and unseemly in growth, still the shoot that they rarely fail to make after this operation, would, in almost every case, exceed the growth of a native plant of three or four years old, and the advantage would remain with the planted tree.

The benefit of trenching * and manuring the ground previously to planting has been much insisted on and strongly recommended in various treatises on arboriculture and planting; we think, however, that those who speak so highly in its favour and recommend its general adoption have been premature in their conclusions, and we fully agree in the opinion expressed by Mr. Matthew in his able treatise on naval timber, that, had they waited the result of twenty-eight or thirty years' growth, their conclusions as to its ultimate advantage would have been very different from those drawn from the state of plants, as exhibited in trenched ground, of eight or ten years' growth. Such also is the inference we draw from our own experience, and, as we have tested the system upon a tolerably extensive scale, and also watched its progress and effect in other instances, we venture to speak with some degree of confidence upon the subject.

About thirty years ago, an extent of about sixty acres around the mansion at Twizell was planted in one season, and, as a new approach was made to run through it, a strip of this ground, about thirty yards in width on each

* See Wither's Pamphlet.

side of the new road and nearly a quarter of a mile in length, was deeply trenched,* and a small portion manured in addition.

The rest of the ground, adjoining the strip on each side, was planted in the usual manner, either by pitting or slitting, as seemed to suit the nature of the soil, a large proportion being a strong loamy clay, the remainder of a lighter nature with a mixture of gravel. The trees planted consisted of Oak, beech, wych elm, sycamore, and larch, with a sprinkling of silver, spruce, and Scotch firs. Six years after planting, the trees in the trenched ground seemed fully established, having, from the second season after they were put in, made long and vigorous shoots, and had reached a considerable size, while those in the untrenched part seemed at that age to be only recovering from the effects of transplantation, or just beginning to push freely away; at twelve years old, the plants in the trenched ground still continued to grow rapidly and luxuriantly, and were far ahead of their neighbours, but the latter had now begun to push vigorously, and to make strong and lengthy shoots; at fifteen or sixteen, the shoots of the trees in the trenched parts began visibly to decrease in length and vigour, in consequence, we may suppose, of the rapid exhaustion of the trenched soil, and the descent of the roots to the unmoved stratum below, which gave, as it appeared, a sudden check to their previously rampant growth; no check of this kind took place with the other trees, as they continued to advance steadily and rapidly every season; at the end of twenty years, though the trees in the trenched parts continued healthy, the annual growth of those in the untrenched ground had, for the last four or five years, exceeded theirs, and

* The cost of trenching at that period was 10*l.* per acre.

the difference in height and size, so marked at an earlier period, was now rapidly decreasing, and in the course of four or five years more, was not observable; since then, or up to the present time, an interval of four years, their respective progress has been nearly on a par, though we think we can discern a slight advantage in favour of those in the untrenched ground; so that, from this experiment, it would appear that in less than thirty years, all apparent advantages from trenching had disappeared, and, we may add, that, in various other instances, where we have been enabled to institute a comparison between the growth of plantations on trenched and untrenched ground, the result has invariably been the same, nor have we been able to discover any marked distinction even where high manuring has been added to the trenching, its effects appearing to be merely temporary, and not of permanent advantage to the tree.

But, even allowing all the advantages as to rapid growth, &c., attributed to trenching by its advocates and admirers, to be true, the cost alone attending the operation must always prevent its adoption upon an extended scale, and, where profit is looked to, it is entirely out of the question, as we feel assured that no growth, however extraordinary, would ever repay the enormous expence incurred in raising timber upon this system, without taking into consideration that a vast proportion of land, well adapted for planting and the growth of timber, could not possibly, from the nature of its surface, be subjected to this operation. Trenching, therefore, may be considered not only an expensive and unprofitable preparation for growing timber, but as money thrown away, inasmuch as it is attended by no beneficial result, neither accelerating maturity, nor adding to the value and quality of the timber when matured.

In forming mixed plantations, where the Oak is introduced, and where it is intended to stand for timber after the other occupants have been removed or thinned out, great attention is necessary in selecting the kinds best adapted for nurses, or as intermediate occupants, and at the same time suited to the soil upon which the plantation is meant to be raised.

In the north of England and in Scotland, where, within the last forty or fifty years, a large extent of surface has been appropriated to the raising of timber, a great error has very generally been committed, in introducing, in too large a proportion, the wych elm, the ash, and the beech, with the oak, as the habit and growth of these species render them peculiarly inimical to the progress of this tree, which bears interference with less patience, and suffers more from close contact, than almost any other; the first, indeed, we think, ought to be almost entirely excluded* from mixed plantations, as it is certain, from its rampant growth for the first few years after being planted, from its wide-spreading head, and the fanlike form of its branches, to overtop, lash, and injure every other species around it, add to which, that it is only upon land of superior quality that it attains a large and valuable size, as it almost invariably becomes stunted and unhealthy upon clayey soils, however rapidly it may grow for the first eight or ten years, during which period it seldom fails to do serious injury to its neighbours, and particularly to the slower-growing Oak.

The ash, also, when it attains a considerable height, becomes a most injurious neighbour to the Oak, for, being drawn up with a long straight stem, of nearly the same diameter throughout the greater part of its length, and

* In low and rich bottom ground it might perhaps be planted with the ash.

terminating in a spreading heavy head, it is easily swayed by the wind, and, from the formidable nature of its strong unbending spray, is certain to do serious injury to every tree that stands within its sweep. The beech, also, from its wide-spreading head, is unfit to plant with the Oak, added to which, its timber when young is of very trifling value.

Trees of a pyramidal growth are those best adapted to plant with the Oak, as they do not interfere with the head growth of this important tree; it is therefore that the larch, the Scotch and the spruce fir are so well suited to act as nurses or secondaries to the Oak, their rapid growth affording a kindly warmth and shelter, at the same time that sufficient head room is allowed to the trees they are meant to foster and protect.

Of the deciduous or hard-wood trees best suited to mix with the Oak, we consider the wild cherry or gean, the sycamore, and the birch as holding the most prominent station, the two first from their pyramidal form during the first twenty or thirty years of their growth, their stiff unbending spray, not easily moved or swayed by the wind; the birch, from its upright and fastigiate growth and its very slender spray, which, though liable to be moved, is of too delicate a texture to injure the more robust and thicker shoots of the Oak. The sweet chesnut, also, and the Cerris Oak may be profitably introduced in suitable soils, as neither of these trees, from their habit, are likely to be injurious to the Oak, and as their timber becomes very valuable at the age of thirty or forty years they are well calculated for secondaries or intermediate occupants. The larch, however, in all districts where it will grow is the tree we would recommend to be planted in the largest proportion with the Oak, being, even as

a mere nurse plant, superior to any of the other firs, as, at the same time that it affords sufficient shelter, it admits, from the nature as well as the deciduous character of its foliage, more light and air at all seasons than they do; it also occupies less room, grows as rapidly, and its thinnings are valuable, even from the size of a hedge stake.

We shall now proceed to make a few observations upon the combinations, or assortment of trees we think best adapted to plant with the Oak, upon soils of various qualities, taking climate and situation also into consideration. Upon land of good quality and loamy nature and tolerably sheltered the following combinations are recommended, and, taking the number of trees to be planted upon each acre at 3000, that is, at rather more than three feet and a half apart, they may be proportioned as follows: first combination, larch 1000, firs Scotch and spruce 400, the spruce for the damper spots, and where the surface soil is light, Oak 600, cherry 600, sycamore 400; a second combination might consist of larch 1200, Oak 600, cherry 300, sweet chesnut 300, Cerris Oak 200, firs 400; a third combination, larch 1500, Oak 600, sweet chesnut and Cerris Oak 400, cherry 250, sycamore or birch 250. Should the 3000 trees per acre, upon this superior soil, be thought too great a number, then the different species may be reduced proportionately to the numbers above given.

On soils of a stiffer or clayey staple, and in upland or more exposed districts, the combination might be first, larch 1000, firs 500, Oak 500, cherry 200, Cerris Oak, chesnut, or sycamore 300, birch 500; or, second combination, larch 1000, firs 600, Oak 600, cherry 300, sycamore and birch 500. In exposed and open districts, where the surface soil is thin and poor, but where the substratum

is of a strong argillaceous nature and capable of bearing Oak, the following combination may be adopted, larch 1200, firs 600, Oak 600, birch 600; or, second combination, larch 1200, firs 800, Oak 400, birch 600.

The Oak is generally planted by the pitting method, and the pits should be made two or three months before the plants are put in, in order that the earth thrown out may become loose and friable by exposure to the atmospheric air; this is certainly the best method upon all soils where superabundant moisture can readily escape, as plants of a larger size can be used, and sufficient room given to the large and lengthy tap root, without cutting off so large a portion of the lower part of it as is frequently done by ignorant workmen to facilitate its insertion in the ground. In stiff retentive clays, however, we prefer the slitting system, using plants of rather smaller size; the great advantage attending this mode of planting is, that no reservoir is formed for any quantity of water to stagnate around, and corrupt the roots, which frequently happens where pitting has been pursued upon stiff retentive soils.

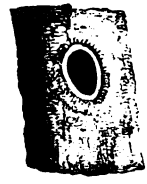
Two years after planting, the Oaks should be carefully inspected, and every plant that seems stunted or of unseemly figure, cut over close by the ground; this operation gives an immediate stimulus to the root below, and it rarely fails to throw up a strong straight shoot, in most instances taller than the original stock that had been cut away. Subsequently the Oak requires very little pruning, and the knife ought rarely to be used except to remove a supernumerary leader, or to shorten a side branch of too rampant a growth, and this ought only to be done whilst the tree is young, and always in summer, or after the expansion of the leaves.

The excision of large branches of the Oak close by

the stem we have always found attended by injurious effects, but to a much greater extent when performed during the dormant or winter season than when the tree was in leaf, and its vitality in full action. If performed during the first-named period, in addition to a rapid taint or incipient decay of the surface of the wound, we have generally observed that the bark at its lower angle lost its vitality and began to decay, thus enlarging the wound to a considerable extent downwards, as shown in the figure, and exposing in addition to the space occupied by the branch, a large surface of the stem to the action of the air and moisture.



This, however, rarely takes place in a healthy tree when the branch is taken off during summer, or immediately after the tree has expanded its leaves, for its vital functions are then in full activity, and it has already begun to elaborate and deposit its layer of alburnum or young wood which immediately begins to form around the edges of the wound as shown in the figure, (where the white ring represents the recently-deposited wood,) and, continuing to advance upon it, has generally by the end of summer so far covered it as to protect the lower angle from the effects of cold and moisture.



But the Oak in mixed plantations, or grown in mass, does not require the artificial pruning that Pontey and others have advocated, to give it length and cleanness of stem, to qualify it when mature for plank timber; in such situations it must necessarily make every effort to keep pace with the growth of the other trees around to

secure its portion of light and air; its growth is therefore for many years principally confined to the elongation of the trunk or main stem; this, together with the confined space to which it is restricted, prevents the vigorous growth and great enlargement of the lateral branches, which always takes place in single trees, or where they have space and air. Indeed the difficulty is to induce the Oak in plantations to retain lateral branches sufficient to maintain and support it in vigorous health, and this can only be effected by oft-repeated thinnings to admit of sufficient light and air, and prevent too close an interference of other trees with its growth and head room; for how often do mixed plantations meet the eye wherein the unfortunate Oaks, from want of air and timely thinning, are drawn up to long consumptive-looking poles, entirely divested of their lateral branches, or as it were deprived of a portion of their lungs, and barely kept in a lingering state of existence by the few top-most shoots, that in the struggle for life have forced their way to the light.

At Twizell, where thinning has been freely administered and carefully attended to, the Oaks in plantations of about thirty years old have run up with fine straight stems, many of them full thirty feet in length, and still carrying an upright leader. All these, however, still retain a portion of their lateral branches, which assist so essentially in the important functions of conducting and elaborating the sap, and without which the deposition of the woody fibre cannot be effected to the extent necessary to the health and vigour of the tree; these laterals, we expect, will retain their vitality so long as the trees require and are benefited by their presence, their removal or decay only taking place gradually, or as the upper branches

which are to form the future head of the tree become enlarged, and are able to take upon themselves the entire support of the lower portion of their trunks.

Upon single trees, or where the Oak stands free and unencumbered, the pruning knife must be used with the greatest caution, and only at an early stage of growth, when it may be necessary to remove a second leader, or to curtail a side branch that threatens to interfere with the form and destroy the balance of the plant; for being naturally a wide-spreading tree, the lopping of the side branches in order to give length of stem, as directed and recommended by some writers, is certain not only to destroy its characteristic beauty and grandeur of form, but to prove most injurious to its growth, as the tree is thereby deprived of those very members upon which its health and vigour mainly depend, not to mention the risk of producing early decay by taint received through the medium of the wounds caused by the excision of the branches.

Timber for naval purposes, we must also bear in mind, is not confined to planking, or that portion of the tree produced by a long straight trunk; the knees and bends formed by the angles the side branches and limbs make with the main stem of the tree, are also of paramount importance in naval architecture, and these are always procured in the greatest perfection from trees that have grown in their natural and expansive form, and hence it is that hedge-row Oak in general affords so large a supply of this valuable denomination of timber.

By some of our arboricultural authors, hints have been thrown out and schemes proposed to obtain by artificial means the various bends and angles required in ship-timber; but however ingenious some of these plans may

be, we do not think the system can be profitably pursued upon an extensive scale; besides, it is now the less necessary, as by the application of steam and mechanical means, timber can be bent and brought to almost any form required. Among the various devices proposed, we think those of Mr. Matthew best calculated to produce the effect intended, and to his observations on this subject contained in his able treatise on naval timber, &c., we refer our readers.

In some parts of Scotland, and particularly in the highland districts, as well as in the west and north of England, Oak coppice wood prevails to a considerable extent; this copse is the produce of the old stocks or stoves of former Oak trees, or of such as have been planted for the express purpose, and is cut over at various periods between the ages of fifteen and thirty years, or according to the rapidity of its growth, which depends greatly upon soil and climate, as the shoots which, in the south of England, and upon good soil attain a diameter of from four to six inches in fifteen years, would, in the colder climate of Scotland require twenty-five years or more to reach the same dimensions.

To the system of Oak coppice wood we are decidedly opposed, and we most cordially agree in Mr. Matthew's recommendation to the holders of such property, that "they should immediately set about converting their coppice hags into Oak forest, either by careful thinning and selection," or by rooting out the old stoves, and replanting the ground with Oak and other trees: no diminution or loss of income, we are confident, would follow such a change; on the contrary, we believe that the return from such woods thus replanted, would be greater even within the first thirty years of their growth than can now be realized

from coppice, to say nothing of the constantly increasing return they would make after this period for a long series of years, or of the value of the crop of Oak that might eventually be left to reach maturity or a scantling fit for naval and building purposes.

The principal inducement that some years ago existed, to retain and cultivate copse wood Oak, is now greatly diminished, for the bark, which constitutes the chief value of coppice, as may be collected from the statements of the author of the "Forester's Guide," the great advocate of this system, which, during the war period, produced upwards of fourteen pounds per ton, having now fallen to less than half that price, the wood is, from its small size, of little importance and value, and the greater part cut in Scotland is either cut up into spokes for carriage wheels, converted into charcoal, or distilled for the pyro-ligneous acid it contains, which latter product is extensively used in calico printing and bleaching operations.

To procure the valuable bark of the Oak* the operation of felling must be performed in the spring, when the sap is sufficiently up to allow of its being easily stripped from the tree; by some it has been supposed that cutting at this season must be injurious to the timber, but this, from the observations and experiments that have been made, does not appear to be the case, and it is found that the heart-wood of Oak cut down in the full run of the sap, is equally as durable as that felled in winter, or in the decline of the year, as well as of trees that have been barked and allowed to stand a year or two in that state previously to being cut down.

In all cases the white or sap wood of Oak is equally

* The bark alone of the great Gelonos Oak, felled in Monmouthshire in 1810, is said to have sold for 200*l.*; this tree eventually produced 675*l.*

liable to perish and moulder away when exposed to the alternation of dryness and moisture, and no treatment has hitherto been discovered* (unless Kyan's solution should prove to be so) to render it as durable as the deeper-coloured heart-wood.

In respect to the age at which the Oak ought to be felled, to produce the greatest profit, that must in a great measure depend upon soil and climate, as well as upon the demand for Oak timber of this or that description and quality in each respective neighbourhood; it may, however, Loudon observes, be taken as a rule, that whenever a tree has reached that period of its growth, that the annual increase does not amount in value to the interest of the money which, at the time, the tree would produce if felled, then is the most profitable time to take it down. For ship timber, Oak of ninety years growth, in the most favourable situations as to soil, &c., such as the weald of Kent, is considered by Mr. Larkin,† an eminent purveyor of naval timber, as the most profitable age for cutting, for although larger scantlings are produced at one hundred and thirty years growth, the increase in the forty additional years will scarcely pay two per cent.

As a hedge-row tree, the Oak is generally allowed to be superior to any other, producing, in this situation, not only the most valuable timber and the thickest bark, but interfering less, from the downward direction of its roots, with the tillage of the ground in its immediate vicinity; its shade and drip also are less injurious to the undergrowth

* We have since been informed that, in Gloucestershire, white or sapwood Oak is rendered durable by immersion in water for six or eight months, previously to its being cut up for use.

† "Gardener's Mag." vol. xi. p. 690.

beneath, than that of any other tree except, as Mr. Matthew observes, the apple and the pear. It is also, in an ornamental point of view, one of the most desirable, from the effect its form and varied outline, as well as its rich and clustering foliage, produce in the general scenery of a cultivated district.

It may perhaps be objected to the planting of the Oak as a hedgerow tree, that its success, at an early age, is less certain than that of some other trees; this, however, we believe, more frequently results from a want of attention to the proper selection and management of the plants, than to any peculiar delicacy or aversion of the Oak to transplantation. We have succeeded in transplanting the Oak of considerable size, and with as great a certainty of success as any other tree, but, in all cases, care was taken to select plants of sturdy growth, to prepare the ground previously to their reception, and, what is of vital importance, effectually to protect them from injury, and the depredations of cattle, sheep, &c.

Mr. Matthew, also, strongly advocates planting the Oak in hedgerows, and gives some excellent directions to ensure success; in speaking of the size of plants best adapted for this purpose, he recommends those of eight or twelve feet high, and which have been reared in exposed situations, and, he remarks, "we have experienced better success with hardy plants from the exposed side of a hill, having unfibred carrot roots much injured by removal, than with others from a sheltered morass, having the most numerously fibred and well extracted roots." We shall now succinctly advert to the Oak in its ornamental capacity, or its use and importance in landscape scenery, for, independently of those feelings and associations naturally attached to a tree that has so essentially contributed to the glory

and welfare of our sea-girt land, it possesses all those characteristics which are considered necessary to give it that value and peculiar effect which alone can satisfy the eye of the painter or the lover of the picturesque. Gilpin, whose taste for natural beauties no one will impugn, after quoting Virgil's graphic description of the Oak, commencing,

Esculus imprimis, &c.

and dwelling upon its massive and well-balanced trunk, characteristic of its firmness and strength, the stoutness of its limbs, appearing, as it were, to be portions of the stem itself, rather than to spring from it like those of most other trees, its twisted and contorted branches, "which like a river sport and play in every direction, sometimes in long reaches and sometimes in shorter elbows," its expansive spread, and its longevity, thus concludes his observations, "I have dwelt the longer on the Oak, as it is confessedly both the most picturesque tree in itself, and the most accommodating in composition. It refuses no subject, either in natural or artificial landscape; it is suited to the grandest, and may with propriety be introduced into the most pastoral. It adds new dignity to the ruined tower and the gothic arch; by stretching its wild moss-grown branches athwart their ivied walls, it gives them a kind of majesty coeval with itself; at the same time, its propriety is still preserved if it throws its arms over the purling brook or the mantling pool, where it beholds

'Its reverend image in the expanse below.'"

Mr Strutt, also, whose delineations of British trees and forest scenery stand unrivalled for their truth, beauty, and artist-like effect, in some valuable remarks on the

picturesque beauty of the Oak, contained in the "Mag. of Nat. Hist.," after pointing to the division of the European trees into four forms or classes, viz., the round, the spiry, the shaggy, and the slender topped, thus speaks of the Oak. "In the first of these classes, (the round topped,) foremost in dignity and grandeur, the Oak stands preeminent, and, like the lion among beasts, is the undoubted lord of the forest. Beauty, united with strength, characterizes all its parts. The leaves, elegant in their outline, are strongly ribbed and firmly attached to the spray, which, although thin and excursive, is yet bold and determined in its angles, whilst the abrupt and tortuous irregularity of its massive branches admirably contrasts with the general richness and density of its clustered foliage."

The horizontal direction of the branches, their strong, tortuous, and sinewy aspect, the angular interwoven nature of the spray, are all suited to the pencil, and give to the Oak, even in its denuded state, a richness of appearance possessed by no other tree. Its foliage, also, is such as a painter likes to delineate, being richly tufted and clustered together, forming those masses which produce the finest effect of light and shade, and its colour is warm, rich, and pleasing, from the period that the leaves first burst their cerements to the rich russet tints they acquire previously to their fall in autumn. The tufting of the foliage, we may remark, is much more conspicuous in the peduncled Oak, than in the sessile-fruited variety, and on this account the former surpasses its rival in picturesque effect, for, as the Rev. W. T. Bree observes, "the leaves of the *Quer. pedunculata*, though rather small, are very numerous and grow close to the spray, clustered in those dense masses which constitute one of the charac-

teristic beauties of the Oak," whereas those of *Quer. sessiliflora*, though larger in size, are less thickly set, and, from the length of the petioles, hang loose and straggling, and give to the general aspect of the foliage that want of depth and solidity possessed by the other. In legendary history the Oak appears to have been invested with a sacred character, and to have been the symbol under which the gods of the Celts and ancient Britons were worshipped, for under this form divine honours were paid by the Celts to their god *Teut*, and by the Britons to *Tarnawa*, their god of thunder. The rites of Druidism were many of them performed under the shade of the Oak, and the misseltoe, when found growing upon it, was held in peculiar veneration. It was from the traditionary recollection of the sacred character of the Oak, even after Druidical worship was abolished, that its wood was always appropriated to the most memorable uses, and it is to ceremonies connected with that worship that the origin of the yule log is dated, with which the Christmas fire, even to the present day, is still lighted in this and some other districts of the kingdom.

In concluding the history of the Oak, we must not omit the extraordinary number of insects that are wholly or partially supported by it, amounting, it is supposed, to nearly two thousand species, fifteen hundred of which may be considered to be phytophagous, or actual feeders upon some portion of the tree, the remainder as parasites attached to these, and belonging to the ichneumonidæ, and other parasitic tribes. To enumerate even a tenth of these inhabitants of the Oak would occupy greater space than we can afford; we must, therefore, restrict our remarks to a few of the most remarkable species belonging to the various orders, and this we do with the less com-

punction for the omission of the rest, as Mr. Westwood has already, in the "Arboretum Britannicum," given an extensive list and interesting account of the Oak-feeding insects. Of those which feed upon the wood chiefly in the larva state, are the caterpillars of the goat moth *(Cossus ligniperda)*, and wood-leopard moth *(Zeuzera æsculi)*, also the grubs of several of the capricorn beetles, among which are *Prionus coriarius* and *Clytus arcuatus*. The *Elater sanguineus*, both in the larva and perfect state, is found in rotten Oak stumps, and the grub of the great stagbeetle, *Lucanus cervus*, is a consumer of the like matter. *Trichius variabilis*, a very rare British insect, occasionally met with in the New Forest, is also an Oakwood eater, as well as several species of *Lymexylon*, which are particularly destructive to Oak timber. Amongst the leaf-feeding species a long list belongs to the lepidopterous order, though the caterpillar of the purple hair-streak *(Thecla quercus)*, is the only one belonging to the butterflies. Of the Sphingidæ, the caterpillar of the beautiful lime hawk moth *(Smerinthus tiliæ)*, is occasionally found upon the Oak, and amongst the Bombyces there are many which feed upon it exclusively, such as the different species of *Chaonia*, *Perridea serrata*, *&c.*, and others only occasionally, as *Lasiocampa quercus*, and *roboris*, *Saturnia pavonia*, and *Tau*, *Pygæra bucephala*, *&c.* Several of the Lithosiidæ are also Oak leaf-eaters, and amongst the numerous Noctuidæ are several species of *Orthosia*, *Glœa*, *Xylina*, and *Xanthia*, also the beautiful *Miselia aprilina*, *Merveil du jour*, the caterpillar, pupa, and imago of which are represented at page 288. Three species of *Catocala* are exclusively Oak-feeders, and another, *Catocala fraxini*, one of the finest of the genus, is occasionally found upon it. Of the Geometridæ, Platyptericidæ, Pyralidæ, Tortricidæ, and

remaining groups of the Lepidoptera there are a vast number of Oak-eating species; we must, however, limit our notice to one whose devastations are sometimes so extensive as completely to denude Oak woods of their foliage throughout entire districts: this is the work of the leaf-rolling caterpillar of the pretty little green-coloured moth, the *Tortrix viridana*, which, in some years, appears in countless myriads. Providentially, these visitations rarely, if ever, continue for more than two seasons successively, otherwise the trees would inevitably perish from the renewed deprivation of their leaves, members so essential to their very existence. How the sudden diminution is effected we can only guess at, but, in all probability it is by that beautiful ordination of providence, where a corresponding increase of those parasitic and other enemies takes place of which it is the accustomed and peculiar prey.

Several coleopterous insects in the perfect state also feed upon the leaves of the Oak; among them is the well-known cockchafer (*Melolontha vulgaris*), the *Orchestes quercus*, or Oak flea, the *Cryptorynchus quercus*, *Agrilus viridis*, *&c.* They are also infested by a species of *Psylla*, by *Aphis roboris*, and *A. quercus*, *Coccus quercus*, *&c.*, and we may here state our belief, deduced from long observation, that the honey dew upon the Oak is invariably the produce of these insects, as we have never been able to trace its presence, except where some of the species were to be detected upon the tree.

Of the various galls or Oak apples, the nidi of different species of cynips, produced by the puncture of the ovipositor of the female upon the different parts where they are found, we shall only mention that, in regard to those beautiful little excrescences so common upon the under side of the leaves of the oak and known by the name

of spangles, we, several years ago, ascertained that they were the nidi of a cynips, having reared a great many of the perfect insects from the spangles collected in the autumn, and kept in a cool and rather moist atmosphere during the winter. About the fall of the leaf, these spangles begin to lose their flat mushroom-like form and red hirsute appearance, and become by degrees raised or bossed towards the middle, in consequence of the growth of the enclosed grub, which now becomes visible when the spangle is cut open. The perfect insect makes its appearance in April and May.

The species of lichens, fungi, and mosses which grow upon the Oak are also very numerous, but, as our description has already exceeded its due limits, we must refer our readers to cryptogamic authors and to the list of these plants contained in the "Arboretum Britannicum."





Quercus Cerris. LINN.

TURKEY, OR MOSSY-CUPPED OAK.

Quercus Cerris,

LINN. sp. pl. 1415.
WILLD. No. 75.
LOUDON'S Arb. Brit. p. III. ch. cv. p. 1846.

THE Turkey Oak is specifically distinguished by oblong, deeply-lobed, and sinuated leaves, with short petioles and hairy beneath, the lobes lanceolate, acute, and somewhat angular. The buds surrounded with long linear stipules

which spring from around their axils. The calyx or acorn cup echinate, or armed with bristly scales.

A century, it appears, has now elapsed since the first introduction of the Turkey Oak into Britain, and though it grows with great rapidity and vigour, bearing, with perfect impunity, our severest seasons, and thriving upon soils of middling and even inferior quality, it has not hitherto met with that encouragement it appears to deserve both as an ornamental addition to our sylva, and as a useful and profitable timber tree. It is from a conviction of its importance in the latter point of view, and supported by the high opinion such writers as Matthew, Bosc, &c., entertain of its valuable qualities, that we admit it into the present work, being anxious, if possible, to bring it into more general cultivation, and to see it take the place of some other trees of less merit in our mixed plantations, particularly in those where the British Oak is intended to form the final crop. Thus, instead of the Wych elm, the beech, and in most cases the ash, which, for the last forty or fifty years, have been planted with too liberal a hand in





most of our plantations, and all of which, from their habit and mode of growth, are inimical to the progress of the Oak, we would recommend, in their stead, the free admission of this tree, as it is not only a less injurious neighbour to its congener, but grows as rapidly, perhaps even more so than any of those above-mentioned, and would, within the first thirty years, return as great a profit by its thinnings, which make excellent barrel staves, and are applicable to various other purposes; when large, or at its prime, which is at seventy or eighty years of age, it would produce a wainscot for cabinet and other internal work, superior in beauty and appearance to that of the common Oak, and, if kept dry, equally as durable.

It may, perhaps, be objected to such an extensive cultivation of the *Cerris*, that plants could not at present be procured from the nurseries in sufficient numbers, or that their cost would not permit of their being used to the same extent as the Wych elm, ash, &c. To this we answer, that there is little doubt but that the supply would increase with the demand, and that means would be taken by the nurserymen to procure whatever seed might be required, if not at home, at least from the Continent, where the tree abounds, and that an extensive sale and steady demand would soon reduce the price of plants to a rate that would allow them to be introduced in any proportion required.

The Turkey Oak, in its mode of growth, differs greatly from the British species, for, even as a single tree, it generally shoots up to a great height, with a straight continuous trunk to which the branches are subordinate, rarely divaricating, or throwing out such huge limbs as the common Oak.

The branches, also, which are remarkable for their ex-

pansion, or gibbosity at their junction with the trunk, generally at first take a more upright direction than those of the common Oak, and, from the position of the buds and mode of growth, are at all ages destitute of that angular and tortuous appearance which characterizes the branches and spray of the common Oak: it therefore usually retains a pyramidal form, and on this account is better adapted, and a more appropriate tree to plant with the common Oak than those we have already alluded to.

The leaves, which are generally persistent in a withered state during winter upon young trees under fifteen or twenty years old, vary greatly in form upon different individuals; they also vary considerably in their colour, in the common or typical shape, being of a fine bright shining green above, and slightly glaucous beneath, in others of a deep green and still more glaucous on the under surface, frequently also approaching in form to those of the hybrid sub-evergreen varieties, *Quer. c. Fulhamensis* and *Quer. c. Lucombiensis.*

The foliage is usually abundant and in fine tufted masses, and the contrast of colour of the two sides of the leaves often produces a sparkling and brilliant effect; this, together with the large size it attains, and its well-balanced form, renders it a very handsome and ornamental tree, though it can never boast of the picturesque appearance possessed by the British species. It grows rapidly, and with great vigour, even in soils of inferior quality, and is found to thrive upon those of a sandy, as well as those of a clayey nature, and even where the latter has been of a cold retentive quality we have noticed it making a progress beyond that of any hard wood tree planted in its company. Upon good wood land, or soil adapted for the Oak, it frequently makes a leading annual shoot

during the first twenty years of its growth of more than two feet, and at Twizell we have young trees which, at eighteen and twenty years old, have attained a height of thirty and thirty-five feet, and a circumference of two feet six inches at one foot from the ground. At Stanwick, Yorkshire, the seat of Lord Prudhoe, there is a beautiful *Cerris* which measures upwards of eleven feet in circumference. As might be expected, from its more rapid growth, the duration of the *Cerris* falls far short of that of the Oak, and it is accounted to be at its prime, or at the fittest age for felling, when sixty or seventy years old. After this period the timber is apt to get shaky, and then begins to decay at the heart.

Hitherto the quality of the British grown *Cerris* has been but seldom tested, few trees having yet attained sufficient age or dimensions for felling. We have, however, an account of two cut down at East Hampstead, in Berkshire, a seat belonging to the Marquis of Downshire, the wood of which was made into doors for some of the principal apartments. Mr. Atkinson,* who gives the account, pronounces the grain to be much finer than that of British Oak, also that it takes a better polish, and is more beautiful than any other Oak wood he had ever seen; the same gentleman, in testing its properties with those of the common Oak, found, that though not quite so strong, it was as tough as native Oak, although the specimen submitted to trial was not of the best quality, but rather cross-grained; and he adds, "for all ornamental purposes where the wood has to be polished it is superior, and must be a profitable tree to plant, as it grows much quicker than our common Oak, and I have seen it thrive rapidly in poor land."

* "Hort. Trans." second series, vol. i. p. 338.

From further information obtained by Mr. Loudon from the Marquis of Downshire, its inferiority to the Oak is principally observed in its greater liability to decay when exposed to weather, or in situations where it is alternately wet and dry; in all others, it is considered scarcely inferior to the wood of English Oak. Upon the Continent it would appear to attain a still greater degree of perfection, as we learn from Bosc and other writers that the wood is good for all purposes, and that in the south of France it is even preferred to any other for ship-building. At Constantinople, also, it is used for naval timber, as well as for the frame-work of houses. This use of the *Cerris* timber, in situations where it must be exposed to the vicissitudes of weather, would imply that, grown in a warmer climate, it brings its wood to greater perfection, and endued with superior protecting qualities than it possesses when reared in a higher latitude; and this agrees with the statement, that the wood of the *Cerris* in the south of France is much harder and more durable than that produced in the northern parts of the same kingdom.

But inferior as the *Cerris* timber grown in England may be in some respects to the British Oak, it is still well worth cultivating for the beauty and excellence of the wainscot it produces, as well as for other purposes to which it is applicable, as staves, joists, beams, &c.; added to which its rapid growth ensures an early profit, at the same time that the beauty of its form and foliage greatly contributes to the decoration and effect of our landscape scenery.

The *Cerris* is a native of the middle and southern parts of Europe, and also extends its range to a portion of Western Asia, being indigenous throughout the greater

part of Asia Minor and Syria. The species is propagated by the acorns, which are borne in abundance after the tree has attained a certain age, and are frequently ripened even in the north of England. The varieties, however, which are numerous, must, in order to prevent further sporting, be continued by grafting, which is done by the slip method upon stocks of the species, or those of the common Oak, and the closer to the ground the graft can be placed upon the stock the better, as it succeeds much more readily when the earth can be heaped around it, so as to leave not more than a single eye or bud exposed.

Plants raised from the seed succeed best if twice transplanted during their stay in the nursery before they are finally removed, as their lengthy tap root generally having a portion cut off in the operation, throws out a greater abundance of lateral roots, a circumstance greatly in favour of their success. The pitting mode of planting must be pursued, as the length and size of the roots prevent their easy insertion by the T or slitting method.

Amongst the varieties of the *Cerris*, the *Quer. c. pendula*, weeping Turkey Oak, seems one of the most beautiful and best deserving of culture; a fine specimen of this variety, now forty years old, growing at Hackwood Park, is figured in Loudon's "Arb. Brit." The *Quer. c. Austriaca* is another well-marked variety, and a native of Austria, Hungary, and other parts of Europe, and to this *Quer. c. cana major* and *minor* seem nearly allied. But the finest and most desirable varieties, in an ornamental point of view, are those sub-evergreen kinds known by the names of the Fulham and Lucombe Oaks. Of the origin and age of the first nothing precise seems known, except that it is supposed to have been raised at Fulham, from seed. It is a fine, broad-leaved, sub-evergreen variety,

with a large branching and rounded head, and a bark slightly corky or rough. The original tree, at the time the "Arboretum Britannicum" was published, measured seventy-five feet in height, with a trunk three feet ten inches in diameter at three feet from the ground, the branches covering a space of fifty-four feet in diameter. In favourable seasons this tree produces abundance of acorns, from which many plants have been raised; these, as might be expected, produce a progeny varying greatly in the form of their leaves, but most of them retain their evergreen character in a greater or less degree.

The Lucombe, or Exeter Oak, is also a sub-evergreen, and was raised by Mr. Lucombe, a nurseryman at Exeter, about 1762, from acorns of the common *Cerris*, which grew in the nursery, and near to a specimen of *Quer. suber.* (cork tree), by whose farina it is supposed the blossom of the *Cerris* Oak was impregnated.

However closely in form the leaves of the Fulham and Lucombe Oaks resemble each other, these trees, in their habit of growth, are very dissimilar, as the Lucombe instead of the round-headed form of the Fulham variety, always presents a fine pyramidal outline, and the bark is also much rougher and more corky, showing its nearer relationship to the *Quer. suber.* It grows freely and with great rapidity, and in some instances has attained a height of upwards of eighty feet in seventy years. To perpetuate the original variety, it must be grafted upon the common cerris, for although it ripens acorns in abundance, these being the produce of a hybrid cannot be depended on as certain to come true to their parent. Several fine varieties, however, have been raised from its acorns, some of which show a still nearer approach to *Quer. suber.* than the parent tree, the bark being still more corky, and the evergreen

character more permanent. Others again revert to the female parent of the Lucombe, and assume the character of the common *Cerris*. The original tree reared by Lucombe, after he had propagated from it extensively, was cut down at the age of twenty years with the intention of having his coffin made out of it. Loudon adds, that he lived so much longer than he anticipated, that several years before his death he had a much larger and older tree cut down, sawn into plank, and carefully deposited under his bed, in readiness for the above purpose.

The wood of the Lucombe Oak is of close texture and very beautiful grain, and no doubt would be very valuable for cabinet work. Some of the varieties produced from its acorns, are also, from Mr. Pine's report, likely to be well worthy of extensive culture, as they grow rapidly and will thrive in bleak exposed situations, even where the common Oak and elm do not succeed. The finest specimens of the Lucombe Oak are said to be those at Killerton near Exeter, the seat of Sir T. Dyke Acland, Bart.; noble trees of the same variety also adorn Carclew, in Cornwall, the residence of Sir Charles Lemon, Bart.





Quercus Ilex. LINN.

EVERGREEN, OR HOLM OAK.

Quercus Ilex, LINN. sp. pl. 1412.
AITON'S Hort. Kew. v. p. 289.
NOV. DU HAM. vii. p. 156.
LOUDON'S Arb. Brit. part III. ch. cv. p. 1899.

OF the various species belonging to the evergreen section of the genus *Quercus*, the common Ilex, or Holm Oak, is

the only one that has been cultivated to any extent, or, indeed, that will grow freely throughout the greater part of the United Kingdom, for although some fine specimens of other species, as *Quer. suber* (Cork tree), *Quer. esculus*, *&c.*, do exist in the south of England and in Ireland, in warm and sheltered situations, they are of too tender a nature to brave the vicissitudes of our climate, unless thus protected, and can never become available, either as ornamental or as timber trees, in ordinary situations. Even the Ilex, in some of our very severe winters, is so far affected as to be deprived of its leaves, as was generally the case during the inclement winter of 1837-8, which proved so destructive to the evergreens and tender acclimated plants throughout the kingdom. The Ilex is a native of the southern parts of Europe, being indigenous to Italy, Spain, and the south of France, and it also extends its range into northern Africa and some parts of Asia. Its power of occupancy does not appear to be great, as it is rarely met with in forest-like masses, but dispersed here and there, singly, or in groups. It also affects maritime regions, where it always thrives with greater vigour, both in its native habitats and in Britain, than in districts removed further inland.

It is a tree of extraordinary duration, and, though its increase after a certain period is slow, it remains in a growing state for many centuries. Pliny, in his memoranda of the Ilex, makes mention of some trees growing in his time, of a greater age than Rome itself, and which at the lowest computation must at that time have been fourteen or fifteen hundred years old. Its first introduction into England appears to have been about the middle of the sixteenth century, or upwards of two hundred and sixty years ago, as it is mentioned by Gerard; and Evelyn,

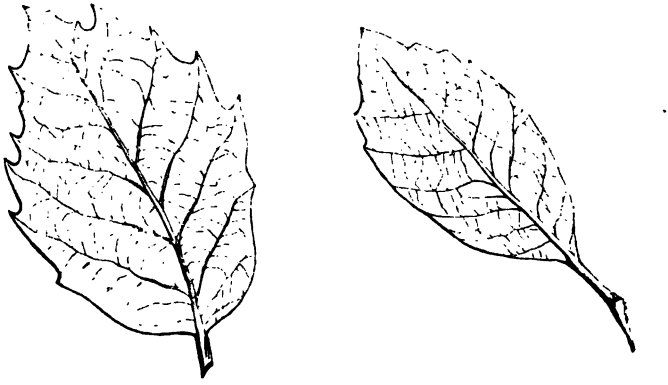
in 1678, speaks of an Ilex growing in the king's privy garden at Whitehall, as "a sickly imp of more than fourscore years' growth." Since that period, as a desirable evergreen and ornamental tree, it has been planted very generally in pleasure grounds, and in many instances has attained a fine timber-like size; such are some of those mentioned by Bradly, as originally planted by Robert Ball, Esq. of Minehead, Devonshire, a late account of which is given in the eleventh vol. of the "Gardener's Magazine," and the dimensions of three of the largest are there stated. One of these was found to be eighty-five feet high, with a trunk eleven feet in circumference; the second seventy feet high, the circumference of the trunk fourteen feet; and the third, a tree inferior in height but of greater bulk, being fifty-five feet high, the circumference of the trunk as much as twenty-two feet. In the north of England, and even in Scotland, it thrives well, as may be collected from the statistics of the Ilex contained in the "Arboretum Britannicum." In Northumberland there are fine thriving specimens, of thirty and forty years' growth, at Howick, the seat of the Earl Grey, and two very fine trees at Falloden, the seat of General Sir H. Grey, of one of which our figure is a portrait; this tree is about forty-five feet high, with a trunk seven feet four inches in circumference at two feet from the ground, and a diameter of head of thirty-six feet, but it covered a much larger space previously to a storm of wind a few years ago, which tore off one of its main limbs. The other is not so high, but it covers a much larger space of ground, the diameter of the spread of the branches being upwards of seventy feet, the circumference of the bole at one foot from the ground eleven feet. Both of these trees are within the influence of the

sea breeze, and we find that at Twizell, which is similarly situated, its growth is tolerably rapid and promising. In Cornwall it is planted extensively, not only for its beauty as an evergreen, but as the best shelter upon the coast for the common as well as the Mossy-cupped Oak, and its endurance of the sea air is strongly exemplified by the healthy appearance of those planted on St. Michael's Mount. At Goodwood, near Chichester, there are many Ilex's upwards of ten feet in circumference at three feet from the ground.

The Ilex thrives best on a deep dry soil, though it also makes good progress in a stiffish loam, provided it be not wet bottomed, which is always injurious to its large deep-descending roots. It is propagated entirely by acorns, which are procured from abroad, or, in fine seasons, from trees in our own country, and the plants are either raised in beds in the open air, or in pots; we recommend the latter method, as the young trees suffer no mutilation of the root, and can at any time be turned out with a certainty of success, whereas, when raised in the open ground, they are, from the nature of their large, naked, carrot-like roots, very difficult to transplant, unless great care has been taken to move them frequently in the nursery, and thus force them to throw out lateral rootlets. Some years ago, we succeeded with scarcely the loss of a plant in transplanting a number of Holm Oaks raised from English-grown acorns; this was effected by nursing them in a stiff loam, and checking the downward direction of their roots by moving them every other year till finally transplanted. The Ilex, when left to its natural growth and fully exposed, is frequently furnished with branches from the very ground, and acquires, as Loudon remarks, the character of an immense bush, rather than that of a

timber tree. It may however, by a judicious application of the knife, be made to assume a handsome form, with a fine straight trunk, and the same effect is usually produced by planting it in company with, and allowing it to be drawn up by, other trees.

The foliage of the Ilex is of a very deep glossy green, the under surface of the leaves being more or less glaucous in different individuals. The leaves themselves vary greatly in form, and in a small seed bed we have had several distinct varieties; in some they are large and broad, with



notched or undulated margins, in others they are prickly, like those of the common holly, and in others, again, they are narrow, with plain and, sometimes, with serrated edges. In short, the modifications of form they assume are so marked and distinct, as to have given rise to several named varieties, and it is even supposed that some of the evergreen Oaks which rank as distinct species are nothing more than varieties of the *Quer. Ilex.*

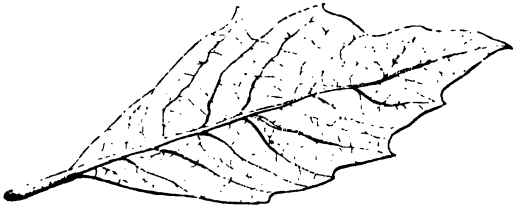
The catkins of the male flowers, which spring from the axils of the leaves of the preceding year, near to the extremity of the branches, are about one inch and a half

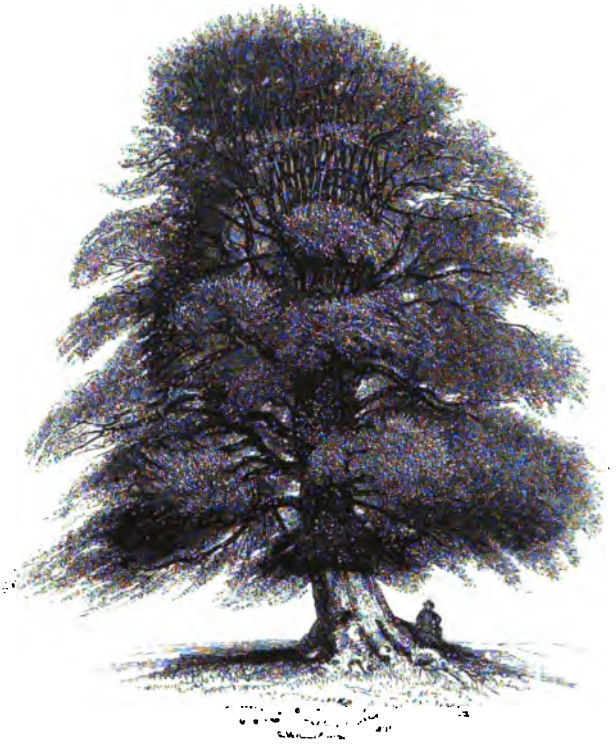
in length, the calyx is campanulate, the stamens six, with filaments twice the length of the divisions of the calyx. The female flowers, from four to eight in number, are sessile upon a common peduncle, which arises from the axils of the leaves of the same year, and the acorns are not ripe till the autumn of the second year. These vary in size and shape upon different trees, and the cup is closely imbricated with small scales. The acorns of the Ilex are generally harsh and bitter, and not eatable, like those of its near congener the *Quer. Grammuntia*, whose fruit is little, if at all, inferior to the finest chesnuts. The heart or matured wood of the Ilex is of a very close texture, extremely hard and heavy, weighing as much as seventy pounds the cubic foot. It is of a brown colour and takes a fine polish, but is subject to split and twist in drying. It is very durable, even when exposed to weather or the alternation of dryness and moisture; and, as its lateral and longitudinal adhesion are considerable, it possesses a flexibility sufficient to render it an excellent material for the handles of hatchets and other tools, as well as for many purposes where great strength and resistance to friction are required. Du Hamel recommends it as a ship timber, but its weight and usual want of scantling are against its employment in naval architecture. It makes an excellent and lasting charcoal, and we learn from Captain Cook's (now Widdrington) "Sketches in Spain," that in Castile the Evergreen Oaks or *Encinas** constitute the only fuel the inhabitants possess, and that the supply is rapidly decreasing from the improvident habits of the peasantry, whose practice it is "to level the whole tract which they attack. The consequence is, that there is a tolerably vigorous spring from the stocks,

* In Spain, *Encina* is the name by which the *Quer. I. Grammuntia* of authors is designated; the other species have each their distinct appellations.

this is soon cut, when a more feeble spring takes place, and is again levelled, after which operation being repeated a few times, every remnant is annihilated, and the country reduced to the open waste it now exhibits."

The bark of this species, like that of its congeners, contains a large proportion of tannin; it is thin, hard, and slightly cracked in old trees, but never corky. Upon the whole, the Ilex must be considered in this country an ornamental rather than a forest tree, though, at the same time, we would wish to recommend its adoption upon a more extensive scale than has hitherto prevailed, especially upon the sea coast, where it not only grows with vigour itself, but also serves the essential purpose of nursing and protecting other kinds of timber.





Genus *Fagus*, LINN.

LINN. *Syst. Monœcia Polyandria.*

Fagus sylvatica. LINN.

COMMON BEECH.

Fagus sylvatica,

LINN. sp. pl. 1416.
WILLD. sp. pl. iv. p. 459.
SMITH'S Eng. Flor. iv. p. 152.
HOOKER'S Brit. Flor. ed. III. p. 411.
MACKAY'S Flor. Hibern. p. 254.
LINDL. syn. p. 239.
LOUDON'S Arb. Brit. p. III. ch. cv. p. 1950.

The specific and distinguishing characters of the Beech are, leaves ovate, obsoletely serrated, and ciliated on their margins. Prickles of the outer calyx simple. Stigmas three.



The Beech is a tree of the first magnitude, frequently vieing in dimensions with the oak, the ash, and the chesnut; its usual form, when growing singly and not drawn up by other lofty trees, is that of an expansive round-headed tree, the stem, below the divarication of the greater limbs, generally short, the head crowded and composed of many branches, which at first form acute angles with the stem, but in old trees frequently bend in the middle and again curve upwards at the extremity; and it not unfrequently happens that, in close-headed trees, where the branches cross and come in contact with each other, a junction or natural inarching takes place. In mass, and growing pretty close together, it runs up to a great height, with a clean straight stem, the lower branches either dying gradually off, or so much checked in their growth as not to interfere with the cleanness of the timber.

The bark, even upon the oldest trees, is thin and smooth, and, when fully exposed to the light, of a pearl, or silvery grey colour.

The leaves are thin in texture, and, when matured, of a deep shining green; in autumn they change to a rich

orange brown, and, during the youth of the tree, are usually retained over the winter, or until the sap begins to move in the ensuing spring.

The male catkins, or barren flowers, are of a brown colour, round-stalked, and drooping; the fertile ones, placed on the branch above them, are solitary and on shorter



stalks. The calyx of the fruit is four cleft, covered with simple pliant prickles; the stigmas, three in each flower, spreading, acute, and downy. The nuts are two, each with three very sharp angles, and crowned with the inner calyx. These ripen in autumn, and generally fall from the calyx, (which bursts open at the upper extremity and remains attached to the branch,) in October and November, and are commonly known by the name of beech mast. They contain a sweet, oleaginous kernel, of pleasant flavour and not unwholesome quality, and amongst animals are a favourite food of swine, deer, badgers, squirrels and dormice, while



they are also greedily devoured by ring-doves, wood-pigeons, and pheasants. In France an excellent oil is expressed from the nuts, which is not only used for the lamp, but for culinary purposes. When carefully prepared, for which approved directions will be found in the "Arboretum Britannicum," it is said to be scarcely inferior to the best olive oil, and has that further advantage, that it produces no unpleasant smell in burning. In England, the only advantage derived from the mast is as a food for swine and poultry.

The roots of the Beech extend to a great distance, and run near to the surface, contributing, with the drip and shade of the tree, to the barrenness of the soil within their circuit.

For the first few years after planting, the Beech is of slow growth, but when once firmly rooted makes rapid progress, and in the course of seventy or eighty years, at which age it is considered to have attained its prime, is frequently from seventy to ninety, or even a hundred feet high, with a trunk as much as twelve or even sixteen feet in circumference. It continues to thrive for more than a century afterwards, and then begins to decay, which process goes on at a rapid rate, as the wood is of a more perishable nature than that of the oak and some other trees.

The Beech is generally allowed to be indigenous to England, and our oldest writers mention it as one of the four aboriginal timber trees of the island. Its limit, however, as a native, seems to be confined to the dry calcareous districts of the central parts of England, or that great ridge of chalk hills which occupies a large portion of several midland counties. In these it frequently occupies extensive tracts as a natural forest, to the exclusion

of all other kinds of timber;* for its power of occupancy, where the soil is congenial, conjoined to its deep shade and deleterious drip, is such as to prevent the interference or growth of any other tree. In Scotland and Ireland it is not indigenous, and according to Dr. Walker was not planted in any quantity in the former till between A. D. 1540 and 1560, and about the same period its first introduction into Ireland is supposed to have taken place. In both these countries, where the soil is congenial, it arrives at as great perfection and attains as great a size as it does in England, as we have ourselves observed in different parts, and as may be collected from the statistics of the Beech in the "Arboretum Britannicum."

Its distribution throughout the temperate parts of Europe is extensive, and it reaches as far north in Norway as 59°, and in Sweden to 58°. It is also found in Asia Minor, Palestine, and other Asiatic districts. On the Alps it seems that between latitudes 45¼° and 46½°, the line of Beeches rises to the height of 5142 feet, the snow line being 3848 feet higher; they occupy the southern slopes of the mountains, the northern of the same zone being generally clothed with the silver fir.

From the description given by Pliny of the Roman Fagus, in which the form of the nut is particularly noticed, as well as the appropriate epithets Virgil has applied to it, there is little or no doubt but that our common Beech was known in Italy by that name, although it might not have been restricted to the species; a supposition some have been led to form in consequence of the passage in "Cæsar's Commentaries," where it is said that no Fagi were found in Britain. It may also, to the readers of

* In America the Beech appears to have the same exclusive power of occupancy; the Beech forests, where they do occur, being entirely composed of this tree.

the present day, appear somewhat extraordinary that Pliny and Virgil should talk of grafting the Beech upon the Chesnut, or that the fruit of the latter should in their day be considered inferior to the mast of the Beech.

Few, we believe, who peruse the pages of "Gilpin's Forest Scenery," will be found to coincide in that author's estimate of the ornamental properties of the Beech, or who will not think that he has overlooked many circumstances, connected with this tree, which, though not exactly adapted for representation by the pencil, or wanting in those peculiar characters which are considered to constitute the picturesque, are, nevertheless, in themselves objects of interest, and calculated to produce, under certain circumstances, the most pleasing effects. It is, however, from the light in which natural objects were almost invariably viewed by the gifted author of "Forest Scenery," that we must attribute that apparent want of interest he seems to have felt and entertained towards individual objects, when not connected with the art of composition; for such was his love and admiration of the pencil, and so closely interwoven were all his feelings and associations with it, that they threw into the background, and out of view, all other qualities and accidents when these could not be made available, or were repugnant to the rules of composition.

Sir T. Dick Lauder, in his valuable edition of this author, when commenting upon the depreciating terms in which the Beech is mentioned, has well remarked, "that this is one of the instances in which the author's love of the art of painting objects of nature with the pencil, and his associations with the pleasures of that art, have very much led him away. We are disposed," he adds, "to go along with him in a great measure so far as we,

like him, draw our associations with this tree from the same source. But we conceive we have much the advantage in the pleasure arising from the contemplation of a noble Beech, as one of the most magnificent objects of God's fair creation."

To such a sentiment we give a willing assent, and though the Beech may not exhibit those characteristics which produce picturesque effect in so eminent a degree as the oak, the ash, and some other arboreal forms, still it possesses in itself many attractions and favourable accidents, whether it be in the form of a vast umbrageous tree, with a short but massive stem, such as it usually appears when growing solitary, or detached from other trees, and such as we may fancy the wide-spreading Beech of the Mantuan bard to have been; or whether it presents a straight and lofty trunk, rising amidst its neighbours like a polished column, and crowned by a canopy of the thickest foliage, such as it is when nursed and drawn up with other trees, or in company with those of its own kind, and where, as combining magnificence with beauty, it has, by an eminent writer on arboriculture, been pronounced as at once the Hercules and Adonis of our Sylva.

Whatever may be the defects of the Beech in composition, and defects we allow it to have, it possesses too many important advantages in itself to be set entirely aside, or banished from our parks and lawns. Its noble and majestic size, its umbrageous and thickly-clothed head, affording, in summer heats, a cool and welcome shade, and which, though without the tufted beauty of that of the oak, or the feathery lightness of the ash, is valuable for the depth it produces in distant scenery; the beauty of its foliage, either when matured and reflecting in gem-like coruscations, from its deep green polished

surface, every play or scintillation of light, or as it first bursts from its envelopes tender in hue and delicate in texture; the smoothness as well as the light and pleasant colour of its bark, which catches and produces those sparkling lights we so oft admire in the stems of a Beechen grove, are all of them strong and powerful recommendations in its favour, and must always counterbalance its minor defects, and those deficiencies which detract from its merits as an artist's tree.

But having thus endeavoured to vindicate the claim of the Beech to protection and favour as an ornamental tree, we are not among those who would recommend its culture on an extensive scale, even in our parks and lawns, a few being at all times sufficient to produce the desired effect; much less would we recommend it to be planted with a view to profit* in mixed plantations, particularly where it is not intended to form the ultimate crop, as from its spreading growth it is a dangerous neighbour to all others in its vicinity, particularly to the oak, and its value in a young state, or before it acquires a tolerable scantling, is so trifling as not to repay for its occupancy. Again, as a single or as a hedge-row tree it is one of the worst we can plant, for, as Matthew observes, "it is the most valueless of all timber when of small size, or when it is of short or crooked stem," which is almost invariably the case when grown singly or in hedge-rows; and it is also in the latter situation, from its dense and widely-extended shade, and the deleterious nature of its drip, more injurious to the herbage beneath than any other tree:

* In Northumberland, about fifty or sixty years ago, the Beech was extensively planted, as at that time its timber was used almost exclusively for making the train or wagon ways, belonging to the collieries. The introduction of iron rails has, however, done away with its use, and the Beechen woods are now almost valueless to their proprietors.

and here we may also remark, that one of the greatest disadvantages attending Beechen woods or groves, is, that no underwood or herbage, with the exception of some orchideous and cryptogamic plants, will thrive beneath their shade: even the hardy holly, a plant that flourishes and bears, comparatively unhurt, the drip and shade of many other trees, pines and languishes under the Beech; laurels and other evergreens, as well as deciduous shrubs, all speedily die when planted beneath its shade.

The wood of the Beech, in a green state, is hard and brittle, neither its lateral nor its longitudinal adhesion being equal to that of the oak, the ash, or the elm. When dry, it weighs about fifty pounds to the cubic foot. It possesses a heart as well as a sap wood, but the line of separation is not so visible as it is in the oak and many other trees, where the heart-wood is always of a deeper colour than the exterior or sap wood. In colour, it varies from a pale brown to white, the darkest-coloured being considered superior in quality, and the produce of the finest trees and best soil. The transverse fibres of the grain are distinctly visible, and exhibit themselves in manufactured articles, in deeper-coloured shining laminæ. Submerged, or kept constantly wet, it is very durable, and valuable for water-works, as well as for the keels and planking of vessels, for which the clean straight boles of trees that have been drawn up in company are well adapted, and recommended by Matthew. Exposed alternately to moisture and dryness, it soon rots and decays, and under cover, or kept constantly dry, no timber is more subject to be worm-eaten; articles of furniture made of Beech are generally attacked by the beetle a few years after they are made, unless protected by some process, such as varnishing, or saturating the wood with boiling

oil. It is, however, very extensively used, not only in Britain, but upon the Continent. In England, a great proportion of common furniture, such as chairs, tables, bedsteads, &c., which are usually either stained to imitate mahogany, or painted in imitation of rose, and other foreign woods, are made of Beech. It is also used for panels for carriages, and for many purposes in joinery and turnery, such as planes, screws, wooden shovels; common fowling-pieces and muskets are also stocked with it, and before cast iron came into use for wheels and pinions, cogs of Beech were greatly used.*

Within a late period, it has been in demand for rail-road sleepers, and should it prove durable and answer the purpose as well as timber of a higher marketable value, the proprietors of Beechen woods are likely to derive a large profit from what was previously unsaleable and an incumbrance upon the ground.

As a wood for fuel, the Beech is considered superior to most other trees, and upon the Continent, where mineral coal is seldom used, and more particularly in France, it is consumed to an immense extent. It evolves much heat and burns with a clear flame, in a fresh as well as in a dry state, and, in both these respects is only inferior to the sycamore and the ash, being superior to the oak in the proportion of 1540 to 1497. The charcoal it produces is of excellent quality, and in Buckinghamshire Beechen wood from coppices is charred in great quantities for the gunpowder manufactories. Upon the Continent the dead leaves, which, when dry, are of an elastic and very imperishable nature, have long been used for filling beds, for

* Loudon enumerates, among other articles, Beech staves for herring-barrels. The coopers upon the eastern coast, however, do not use them, as they will not retain the pickle used in curing the fish.

old Evelyn speaks of them in Switzerland, where, he says, "I have sometimes lain on them to my great refreshment;" and Sir T. Dick Lauder, after quoting the passage from Evelyn, and speaking of the excellence of the beds in Italy, made of mattresses filled with the elastic spathe of the Indian corn, adds, "but the beds made of Beech leaves are really no whit behind them in their qualities, whilst the fragrant smell of green tea which the leaves retain is most gratifying."

As coppice or undergrowth the Beech is not of long duration, as the shoots generally cease to push after forty or fifty years, and Buckinghamshire appears to be the only county in which coppice Beech prevails to any extent. As a hedgerow tree, we have already stated strong objections to its use, both on account of the general inferiority of its timber so situated, and the injurious quality of its shade; but for narrow upright hedges, to divide or enclose nursery grounds, gardens, or even small fields, the Beech is superior to the hornbeam, or any other deciduous tree, as it not only bears the shears equally well, and may be trained to as great a height, but retains the leaves during winter, thus affording additional shelter and warmth, and giving a richness of appearance the others do not possess. The natural soil of the Beech appears to be such as is of a dry nature, either calcareous or when mixed with sand and gravel, though it also thrives well and attains a large size upon clayey loam: indeed, provided the substratum be dry, the Beech will thrive and attain respectable dimensions upon most variety of soils. At Knowle, in Kent, where a celebrated Beech is now growing, the soil is a pure sand; and at Panmure, in Forfarshire, in a clayey loam, Sang mentions Beeches ninety feet in height, with clean trunks of fifty feet. At Twizell, upon

clayey loam, with a calcareous substratum, it grows remarkably well, and at Dunstan Hill, near Newcastle-on-Tyne, in a fine free loam, there are thriving Beeches, with boles from twenty-five to thirty or forty feet in height, many of which measure ten and twelve feet in circumference at the base.

The Beech, with the exception of the varieties, is propagated entirely by seed, and the mast or nuts are gathered when they fall from the trees, in the months of October and November. They may either be sown immediately, or, which we deem the preferable plan, mixed with dry sand till March or April, as, by sowing in spring, germination commences immediately, and they are thus more likely to escape the destructive ravages of mice and other vermin. The earth of the seed beds should be of a light nature, rich, and well pulverized, as the young plants are rather tender, and the seed should not have a covering of more than one inch. After remaining two years in the seed bed, they may be run into nursery rows, taking care not to prune or trim either the roots or stems too much; in these rows they may remain two or three years, when they will be large enough to put out, unless required of an extra size, in which case they should again be transplanted, increasing the distance between the plants and rows, according to the size it is intended the plants should attain before they are finally put out. The Beech requires to be planted by the pitting method, as the roots are numerous, and too large to be easily inserted by the slitting or T system. In a year or two afterwards, when the plants appear dead in their tops or are making little progress, it may be advisable to cut them over, either near to the ground or where a young and healthy shoot appears, and it is necessary to attend to their growth for some years

afterwards, as no tree is more liable to throw out additional or supernumerary leaders and large interfering branches than the Beech; to these the pruning-knife must be applied, but we by no means recommend that excessive pruning and denuding of the stem advocated by Pontey and other arboriculturists; on the contrary, as more consonant with the principles of vegetable physiology, we would allow most of the side branches to remain, merely thinning out where they interfered or grew too close together, or shortening in such as appeared of too rampant a growth for the other parts of the tree; for, as Matthew well observes, "In pruning, every means should be taken to increase the number of feeders, in order that none of them may become too large, and no healthy regular feeder should be lopped off till the tree has reached the required height of stem and a sufficient top above this for the purpose of growth, at which time the feeders upon the stem, as far up as this necessary height, may be removed." We would add, not entirely, but leaving a few to break the nakedness and give value to the appearance of the stem, for we are no admirers of a Pontey-like Beech, whatever merits it may have in the eyes of the timber-merchant, wood-valuer, or carpenter.

In mass, or in mixed plantations, indeed, there is little fear, from the confined situation in which they are placed, of the side branches or feeders ever attaining so large a size as to injure or interfere with the straightness and length of the bole; the difficulty, sometimes, is to keep them alive, in order that the tree may be kept in a healthy state, so as to insure a due increase of the stem. In open situations, or when standing alone, where the natural form of the Beech is that of an expansive, round-headed tree, any attempt to force it to a long, naked stem by severe

pruning, can only end in producing an unsightly ill-conditioned object; under these circumstances, all that can, or ought to be done, is to remove, during youth, supernumerary leaders, or curtail branches of too exuberant a growth. The excision of large branches of the Beech, close by the bole, is always attended by bad effects, as decay is certain to extend rapidly downwards, and communicate its taint to the main body of the tree, and no branch much thicker than the arm should ever undergo close amputation.

Of the varieties of this tree, that with the deep purplish red foliage, the *Fag. S. purpurea* of the "Hort. Kew.," is one of the most remarkable and best worth cultivation, and which, when distributed sparingly and with judgement in our pleasure grounds, produces a very striking effect, from the contrast of its colour with the surrounding foliage. The original tree, which is said to be still living, was first discovered in a wood in Germany, some seventy or eighty years ago, and from it all the Purple Beeches now growing in Europe have been propagated, either by grafts or from seeds. The latter, though they frequently come true to the parent in point of colour, have also given rise to subordinate varieties, differing in the shade and intensity of the red or purple tinge, and to that more marked deviation which has received the name of the Copper-coloured Beech (*F. S. cuprea*). In England there are now fine specimens of the Purple Beech, and Loudon mentions one as the handsomest, now growing at Enville, and which, in 1831, was between sixty and seventy feet high, clothed with branches to the ground, where it extended over a space above sixty feet in diameter. There is also a variety with variegated, and another with laciniated leaves, both more curious than beautiful, and not

so deserving of cultivation as some of the pendulous varieties that have accidentally occurred in different localities, such as that at Oriel Temple, in Ireland, another in Northamptonshire, mentioned by Loudon on the authority of the Rev. M. J. Berkeley, or a third that we have been informed of by W. C. Trevelyan, Esq., now growing at Craigo, in Forfarshire, a fine flourishing young tree of about thirty years' growth, and as pendulous in its character as any of those mentioned or figured in the "Arboretum Britannicum." The Beech generally preserves its form and balance remarkably well, as it is not so liable as many other forest trees to suffer from storms of wind and snow; its limbs and larger branches, from the angle they form with the trunk, presenting less leverage, and the slender nature of its spray offering much less resistance than where it is heavy and thick.

The diseases to which it is subject seem very few, for the smooth nodes often met with upon the trunk and larger branches seem in no way injurious to its health or growth. Loudon seems to think these may originate from the puncture of an insect, like the galls upon other trees; we have not been able to verify the fact, and are rather inclined to attribute them to some slight local derangement, or the extravasation of injured sap-vessels. The leaves are sometimes a little disfigured by a tufted pimple or excrescence, by some botanists considered to be a fungus, but which the Rev. M. J. Berkeley, one of the first cryptogamists of the age, believes to be a disease produced by suborganisation of the cellular tissue.

Unlike the oak, whose wood and foliage afford food to whole armies of insects, the Beech is comparatively attacked by few, its principal enemies being caterpillars belonging to the Lepidoptera. Amongst these the following

are the most interesting: of the Bombyces, *Stauropus fagi* (Lobster moth), *Lophopteryx camelina*, *Petasia cassinea*, *Endromis versicolor*, and *Agläia Tau*; amongst the Noctuidæ, are *Orthosia stabilis*, and *Catocala fraxini*; and of the Geometridæ, *Himera pennaria*, *Lobophora hexapterata*, *Epione vespertaria*, *Drepana unguicula*, and *Hylophila prasinaria*. In spring, when the leaves first burst, they are frequently riddled with innumerable holes by *Orchestes calcar*, a small saltatorial weevil. *Psylla fagi*, whose larvæ and pupæ, covered like the *Eriosoma* with a white cottony substance, inhabit the under surface of the leaves, are also often very numerous.

The fungi belonging to the Beech are several, as may be seen from the list in the "Arboretum Britannicum." Amongst the most interesting is the *Tuber cibarium* (Truffle), which is found growing beneath the surface in old Beech woods, and is highly prized in cookery; *Helvella esculenta*, also, another edible fungus, and flavoured like the morel, is frequently abundant under the Beech. After the extensive list given by Loudon of the finest and largest Beech trees that have existed, or are now growing in Britain, we deem it unnecessary to occupy the time or attention of our readers with a further enumeration, more particularly as there is scarcely a district or park within the kingdom that does not possess fine and well-grown specimens: we shall only add, that a height of ninety or one hundred feet, with a circumference of stem from twelve up to twenty-two feet, is not rare among the examples given of the Beech.



Genus *Castanea*, TOURNF.

LINN. *syst. Monœcia Polyandria.*

Castanea vesca. GÆRT.

SWEET, OR SPANISH CHESNUT.

Castanea vesca,

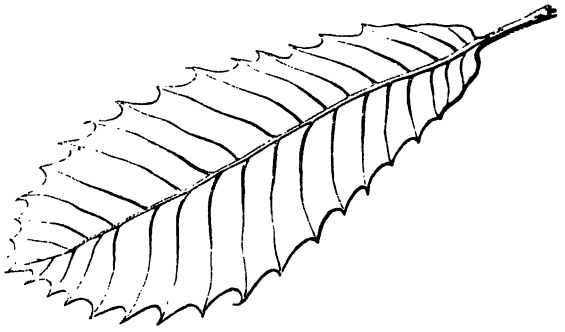
GÆRT. vol. i. 181. t. 37. f. 1.
LINDLEY'S Syn. p. 171.
LOUDON'S Arb. Brit. ch. v. p. 1983.

Fagus Castanea,

LINN. sp. pl. 1416.
SMITH'S Eng. Flor. iv. 151.
MACKAY'S Flor. Hibern. p. 251.

Specific characters.—Leaves long, lanceolate, deeply serrated, and acuminate, glabrous on both sides. The prickles of the calyx compound and entangled. Stigmas six.

Though the oak is usually called, and, indeed recognized as the monarch of the woods, it has a rival of formidable pretensions in the tree we are about to describe. In dimensions, and in longevity, the Chesnut seems in no way its inferior; nor do we think it less picturesque in form, or its foliage less imposing, either in richness or effect; and though the spread and diameter of the head of the Chesnut may, generally speaking, not be so great as that of the oak, its ramification is equally bold and easy,



and its trunk presents a still more effective and striking exterior, from the deep and wide clefts into which the bark is split and divided. In fact, the only particular in which the Chesnut exhibits a decided inferiority, is in the quality of its timber, which, unlike that of the oak, which gains strength and durability by age, begins to deteriorate at heart, ere the tree has passed much beyond the first half century of its growth; this seems a point well ascertained and established, and not as Mr. Matthew seems to suspect, incidental to the action of climate upon the Chesnut in this country, as the timber

of this tree, even in warmer continental districts, is affected in the same manner, and at as early an age as it is in England or in Scotland.

By Linnæus and several other botanists the Chesnut was included among the beeches, *G. Fagus*, but by most of the moderns it is considered sufficiently characterized to warrant generic separation, the male flowers or catkins of *Castanea* being long and cylindrical, and the fruit farinaceous, while *Fagus*, on the contrary, has the male flowers in globular catkins and the nuts oily.



The male or barren catkins are numerous, axillary, solitary, and pendulous, of a yellow colour, and nearly as long as the leaves, the flowers in sessile tufts along the common stalk, the stamens numerous and spreading. The fertile flowers are much fewer and on terminal stalks, which lengthen as the fruit advances; the styles are about six, with long, smooth, upright stigmas. The nuts are large, broadly ovate, generally two, flat on the inner side, and

attached by a broad scar to the bottom of the outer calyx, whose outside is armed with complicated sharp prickles.

In suitable soils in the south of England the growth of the Chesnut during youth is more rapid than that of the oak, and it usually makes annual shoots of two or three feet in length, and in the course of fifty or sixty years frequently attains a height of from sixty to eighty feet; northwards, it is slower, but still bears the same relative proportion to that of the oak. Its timber, however, even at this age, begins to get shaky at heart, or what is termed ring-shaken, the annual layers or circles at the centre separating from each other, and it is found to be at its greatest perfection a few years earlier. It continues, however, to live and thrive in despite of this internal disorganization for many centuries afterwards, as the enormous trees we meet with, as well as those which have been recorded, sufficiently attest; for, although decay and disruption of fibre may take place internally at the age we have stated, the tree still continues to grow luxuriantly and to enlarge externally, supported by the younger rings and layers of the woody fibre, and by its deep-descending roots, without exhibiting for many ages in its exterior any symptoms of that decay which gradually progresses from the centre towards the circumference.

By some, the Chesnut has been considered as indigenous to England, and Sir J. E. Smith, in the "Eng. Flor.," says, "that it appears to be wild in the south and west of England." The more general opinion, however, is, that it is not a native, but was introduced at a very distant period, probably by the Romans; and it is even supposed that the famous Chesnut at Tortworth, in Gloucestershire, the remains of which are still in existence, may have been planted during their sway. The belief which so long and so gene-

rally prevailed, and, indeed, we may add still partially exists, that the roofing and main beams of many of our ancient buildings and houses were framed of the Chesnut, naturally gave rise to the idea that a tree so abundant and generally distributed as it must have been in former ages, must also have been of indigenous growth; for this supposed Chesnut timber, we may remark, is not confined to buildings in the southern and midland districts of the kingdom, but is also found in the northern counties, and even in Scotland, for Sir T. Dick Lauder, apparently not aware of the discoveries of Daubenton and others, instances the roof of the parliament house in Edinburgh, as constructed of Chesnut.*

The examination, however, and the repeated experiments that of late years have been made upon this wood, have satisfactorily proved that, in all such instances, the timber of the oak, and chiefly of the sessile-fruited kind, have been mistaken for Chesnut; and this fact, in a great measure, does away with any argument that might otherwise have been adduced in favour of the Chesnut's indigenous origin, had the application of its timber in reality been as extensive as these ancient buildings seemed to indicate. It is also more in accordance with what we collect from the earliest of our arboricultural writers, viz., that the Chesnut in their time was by no means of common occurrence or widely distributed; for Tusser, in 1512, enumerates Chesnuts in his list of fruit trees to be planted at a particular period of the year, and the author of an "Old Thrift Newly Revived" recommends planting the Chesnut as "a kind of timber tree of which few grow in

* It is remarkable that the same belief of the use of Chesnut wood in ancient buildings also prevailed in France. Buffon, however, and afterwards Daubenton, showed that the timber taken for that of the Chesnut, was, in fact, that of *Quer. sessiliflora.*

England." It is, however, worthy of remark that, shortly subsequent to this period, the timber of the Chesnut seems to have been confounded with that of the oak, for Hartlib, who wrote a few years after the author of the above-named treatise, says, "in divers places in Kent, as in and about Gravesend, in the country and elsewhere, many prime timbers of their old barns and houses are of Chesnut wood, and yet there is now scarce a Chesnut tree within twenty miles of the place and the people altogether ignorant of such trees." Evelyn also fell into the same error, for, speaking of the Chesnut, he says, "I had once a very large barn near the city, framed entirely of this timber," which he supposed might have grown near this barn, as "Fitzstephen had, in the reign of Henry II., described a large and noble forest that grew on the northern side of London."

The fact is, as Buffon first observed, the wood of the oak, more particularly that of the sessile-fruited variety, assumes, in course of time, a near resemblance in colour to that of the Chesnut in its best condition, or when young and untainted at heart; and as few Chesnuts could have acquired the scantling frequently observed in the timbers of these ancient buildings at the age dialing or decay almost invariably commences, this, in itself, furnishes a strong argument against the use of Chesnut timbers and beams by our ancestors, inasmuch as the trees must have become unfit for the purpose long before they had attained the necessary dimensions. Another argument against the indigenous origin of the Chesnut is the generally received opinion that it is not even a native of the warmer parts of the European continent, such as the south of France, Italy, Spain, &c., where it nevertheless abounds and seems to grow wild, but was first introduced by the Romans

from Greece, whither it had been brought from Asia Minor, of which, as well as of other parts of the Asiatic continent, it is a native. By the Greeks it was called *Sardionos Balanos* (Sardis nut), and also *Kastanea*, from the town of that name, both of which titles were adopted by the Romans on its introduction into Italy. Virgil, in his eclogues, mentions its fruit as the *molles castaneæ*, and its commanding aspect, as a tree, in the second Georgic,

——————ut altæ castaneæ, &c.

Pliny enters more fully into its history, enumerating the several varieties then existing, the difference and quality of the fruit produced, and the purposes to which the nuts were applied, together with the mode of preparing them for food. It is also a native of the north of Africa, and the species is supposed to be the same in North America.

From what has already been stated in regard to the timber of the Chesnut it is evident that, after a certain and that comparatively an early age, it becomes so deteriorated by the separation and decay of the internal layers as to be of very little value; and that for all purposes where a large scantling is required, it cannot be depended upon or come into competition with the oak and many other trees. This, however, is no reason for excluding it from our plantations, even where profit is the only object in view, for until the decay at heart actually commences the timber is of excellent quality, and for most purposes, where durability is required, equal to that of the oak, This excellence arises from the very early period at which it begins to heart or mature its wood, as well as from the very small proportion the sap bears to the matured wood, even in trees of only a few years' growth; and it is no uncommon thing to find, in trees not more than thirty

or thirty-five years' old, the whole of the bole converted into heart-wood, with the exception of two or three of the outermost rings. In appearance and colour the wood bears a resemblance to that of the oak, but may always be distinguished by its want of the large laminæ (flash) or transverse fibres, which are seen in the oak, particularly when cut perpendicular on the outside, in the plane of these laminæ.

For gate and other posts, railing, spars for building, piles, and various other purposes not requiring wood of large size, it is well adapted, and perhaps as durable as any other timber we possess. It also makes excellent barrel-staves, and as an underwood produces a large crop of strong and durable hop poles, for which express purpose it is in some districts cultivated to a considerable extent, the stools continuing to throw up a succession of shoots, when cut over for a long series of years. The precocity, if we may so term it, of the Chesnut places it high in the list of those trees we deem best adapted to insert in mixed plantations, particularly where the oak is intended to form the ultimate crop; for, in addition to the valuable properties of its wood from a very early age, which, therefore, render it particularly adapted for an intermediate occupant, or one that has finally to give place and room to others, it is, from its habit and mode of growth among that class of trees least liable to injure the oak by its propinquity. In this latter respect, we consider it nearly on a par with the sycamore or the cerris oak, its growth in plantations being upright, stiff, and unyielding to the wind, the ramification thin and open, and the head tapering and narrow, rather than spreading, and this form it usually retains till of age to be cut down, which ought seldom to ex-

ceed thirty-five or forty years, as soon after that time dialing at the centre may be expected to commence. In all suitable soils, therefore, we recommend it to be planted with the oak as a secondary tree, having done so ourselves with great success, and convinced that it will repay for its occupancy as well as any other tree we could have planted. Upon the Continent the same objection applies to it as in our own climate, as it is found that decay at heart takes place at a period of its age equally early. As a timber tree, therefore, it is in no repute, and the principal use to which the wood is applied, when young and sound, is for wine casks and hoops. It furnishes a strong and good charcoal, though scarcely equal to that of the oak for domestic purposes, but considered superior to that of any other for forges, for which purpose it is much used in Spain and also in Switzerland. As a fruit tree, however, it is viewed in a very different light, and as such held in higher estimation than with us, who make but little use of the nuts as food, and seldom eat them except at dessert. In many continental parts, such as the south of France, north of Italy, Spain, &c., Chesnuts form an important article of food, and serve in a great measure as a substitute for bread, or, as compared with our diet, for the potatoe. They are prepared and eaten in various forms, sometimes plain boiled or roasted, or they are reduced to flour, which, properly secured and taken care of, will keep good for several years.

Of this flour, *la Galette*, a thickish kind of girdle cake, mixed up with a little milk and salt, and sometimes with the addition of eggs and butter, is made; *la polenta* is also another preparation made by boiling the chesnut flour

in milk till it becomes quite thick; when made with water, it is eaten with milk in the same manner as oatmeal porridge in the north of England and Scotland. *Chatigna*, that is chesnuts boiled and then mashed up as we do potatoes, is also another preparation common in France and Italy, besides which there are others which may be found in Parmentier's "Traité de la Chataigne," or under the article CHATIGNIER, *Dict. Class.*

The soil upon which the Chesnut seems to attain its greatest dimensions, and to produce the best timber, is upon a loam of tolerable quality, for in very rich soils it as it were outgrows itself, and the wood is brittle and good for nothing. It also thrives well upon clayey loam, provided it be not too retentive of moisture; rocky situations are also favourable to its growth even where there appears to be but little soil. Bosc remarks, that he never saw chesnuts on soils or on surfaces adapted for the production of corn. On the mountains in France, Switzerland, and Italy, he adds, the Chesnut begins where the corn leaves off, and in climates suitable for corn the tree is only found in rocky and flinty soils. In our colder climate it requires a warmer and more sheltered situation, and a tolerable depth of soil to rear it to large dimensions; for though, as Loudon observes, it may attain great longevity and a considerable diameter of trunk in thin and gravelly soils, it never reaches any height but always retains the appearance of a pollard.

We have already stated the high estimation in which we hold the Chesnut as an ornamental tree, and in this are supported by the author of "Forest Scenery," who describes the Chesnut, at maturity and perfection, as a noble tree. This is the tree, he adds, "which graces the landscapes of Salvator Rosa. In the mountains of Calabria,

where Salvator painted, the Chesnut flourished; there he studied it in all its forms, breaking and disposing it in a thousand beautiful shapes as the exigencies of his composition required." His accomplished editor also, Sir T. D. Lauder, panegyrizes it highly, and thinks that "it is, perhaps, the noblest tree in our 'British Sylva.'" In



all our park and woodland ornamental scenery, whether as a single tree it is intended to stand prominently forward in all its individual beauty and magnificence, or, in combination with other denizens of the forest, to give additional effect by the contrast and tufting of its rich and splendid foliage and the outline of its form, the Chesnut ought to be freely introduced, and with a more liberal hand than appears hitherto to have prevailed. Profit on such occasions ought never to be considered; it is the eye and taste alone that are to be consulted.

The Chesnut is propagated by the nuts, with the excep-

tion of the varieties, which, to perpetuate, must be grafted. Well-ripened and the finest nuts ought to be selected; and, as they are a favourite food of mice and other vermin, are best kept over the winter months in dry sand, to preserve their vegetative powers, and not sown till the beginning or middle of March. They may be sown either in drills or in beds, the nuts being covered to the depth of nearly three inches; and in the few trials of raising the Chesnut from seed that we have made, we found that furze cut up into small pieces, and placed both above and below the nuts, was a good preservative against the attacks of the vole and field mice, and did not affect, at least injuriously, the success and growth of the seedlings. From the seed-bed, after a year's growth they should be run into nursery rows, from whence they may be transplanted into their permanent stations in two or three years, for we have found that small plants of three or four years' growth succeed much better than those kept in the nursery till of larger size. After being planted out, we have found it advisable, in case they did not push freely, or remained stunted, crooked, and unsightly, to adopt the method often pursued with the oak, and other kinds of hard wood, viz., to cut them over close by the ground, which almost invariably ensures a straight, strong, healthy shoot from the root. During youth the side shoots sometimes require shortening or cutting in, and now and then a second leader has to be extirpated; but no excessive pruning, like that described by some of our arboriculturists, ought ever to be adopted when beauty and elegance of form are desired.

The amputation of large branches, close by the bole, is also always attended by bad effects, and contributes to the speedier decay of the tree.

From the tufted and weighty nature of the foliage, the brittle quality of the shoots, and the angle formed by the junction of the branches, the Chesnut is liable to be torn and injured by autumnal winds and storms. It is seldom, however, that the foliage is disfigured, as the leaves are eaten by few insects, and the only caterpillar we have seen feeding in any numbers upon the leaves, were those of *Pygæra bucephala* (Buff-tip Moth), and in those instances the attack was confined to plants of twelve or fourteen years' growth. In some seasons, particularly upon the Continent, the embryo fruit is attacked by a kind of weevil, the *Pyrale Pflugione*, Fab., which commits considerable injury, as all the nuts pierced by the insect in depositing its eggs never attain their full size, but drop off before they are half ripe.

Many varieties of the Chesnut, remarkable for the quality of their fruit, either as regards size, flavour, or early ripening, are extensively cultivated, and the kinds continued by grafting.

In France great attention is paid to the cultivation of the Chesnut, and they divide the varieties into two sections, *les chataignes* and *les marrons*, the latter being held in the highest esteem as producing nuts of the largest size, finest flavour, and farinaceous qualities.

In England, also, several varieties have been raised and propagated, such as the Downton, the prolific, Knight's prolific, the Devonshire, Masters's, Canterbury Chesnuts, &c., and Loudon mentions that twenty sorts are cultivated in the London "Hort. Soc." garden. There are also several botanical varieties, such as the Cut-leaved Chesnut, *C. v. asplenifolia*, the Hooded *C. v. cucullata*, the Glossy-leaved *C. v. glabra*, and the Variegated *C. v.*

variegata; all, except it may be the Glabra, inferior to the species in beauty, and not worth cultivating, unless in large arboretums for the sake of the deviation from the type.

In Britain, Chesnut-trees of enormous dimensions are recorded, several of which are still in existence. These prove the early period at which the introduction of the species must have taken place; as an instance, we have the famous Tortworth Chesnut already alluded to, and which some suppose may have been planted in the time of the Romans; however this may be, it is certain that in the reign of King John it was known as a boundary tree, and in that of Stephen, was so remarkable for its size as to be called the great Chesnut of Tortworth. It is beautifully figured by Mr. Strutt, in his "Sylva Britannica," and in 1820 its circumference, near the ground, was fifty-two feet. Another very ancient Chesnut is that growing in the park at Cobham, in Kent, called The Four Sisters, also figured by Strutt. Greenwich Park and Kensington Gardens also boast of many ancient hollow and pollard-like Chesnuts. Numerous magnificent and thriving trees are also to be found in various parts of England; amongst others, we may mention one at Nettlecombe, Somersetshire, the seat of Sir John Trevelyan, Bart., which was planted within the recollection of his father, the late Sir J. Trevelyan, who died in 1828. The dimensions of this tree are as follow:—height, sixty feet, circumference of trunk, at four feet from the ground, seventeen feet four inches; the solid contents, three hundred and seventy-three feet, or nine tons thirteen feet. Another tree at the same place, cut down in 1752, had a stem thirty-four feet in length, and which squared six feet

six inches. Its solid contents, one thousand four hundred and thirty-six feet. In Sussex, at Cowdray, there is a noble avenue of Chesnut trees, the circumference of whose trunks averages six feet, with a height of forty or fifty feet. At Croft Castle, Herefordshire, many of the Chesnuts which adorn its grounds have attained a magnificent size; the largest is upwards of eighty feet high, with a trunk of nearly nine feet in diameter, and a head upwards of one hundred and twelve feet in diameter.

In the north of England it also attains a large size when planted in a favourable soil. At Belford Hall, in Northumberland, upon a free loam over the Whintrap, at about seventy years old, it is from seventy to eighty feet high, the circumference of the trunk about ten feet.

In Scotland it also appears to have been introduced at an early period, and as Sir T. D. Lauder remarks, "it is found near all the old aristocratical residences of that country." At Ricarton, near to Edinburgh, there is an ancient Chesnut, whose trunk measures upwards of twenty-seven feet in circumference. The celebrated Findhaven Chesnut was also of uncommon bulk, and long accounted the largest tree in Scotland. Sang mentions several large Chesnuts, the least of which was eight feet six inches in circumference, and the largest seventeen. At Inverary, we have often admired the large Chesnuts which grow near to the Duke of Argyle's stables, and which are still thriving and in vigorous condition.

Ireland also is favourable to the growth of the Chesnut, and many fine trees are to be seen in that country. Loudon mentions trees at Bellione which, at the time he wrote, had not been planted more than twenty-seven years, that had trunks of from five to seven feet in cir-

cumference at one foot from the ground. At Twizell, about eighteen years planted, it is twenty-eight feet high, and three feet in circumference at the base.





Genus *Carpinus*, LINN.

LINN. *Syst. Monœcia Polyandria.*

Carpinus betulus. LINN.

COMMON HORNBEAM.

Carpinus betulus,

LINN. Syn. pl. 1416.
HOOKER'S Fl. Scot. p. 274.
SMITH'S Eng. Flor. vol. iv. p. 155.
MACKAY'S Flor. Hibern. 256.
LINDLEY'S Syn. p. 240.
LOUDON'S Arb. Brit. ch. cv. p. 1004.

Common, and widely diffused as the Hornbeam is found throughout the greater part of the kingdom, it is nevertheless much better known as an underwood or as a hedge plant, than in its form of a timber tree with dimensions sufficient to place it among those of the second, if not of the first rank. Sir J. E. Smith, indeed, and Sir W. J. Hooker, in their botanical works, call it a small and low tree, but this is by no means its general character, or applicable to it when allowed to grow unmutilated and in soils suited to its habit; under favourable circumstances it attains a height of from forty to fifty feet, with a trunk of commensurate thickness, and which often reaches a circumference of six or eight feet.

Specifically the Hornbeam is distinguished, according to Smith, by the bracteas of the fruit being oblong, flat, serrated, with two lateral lobes.

In general form and appearance it bears a considerable resemblance to the beech, though its head is even closer, more rounded, or what may be termed cabbage-like, being composed of a confused assemblage of long flexible branches, and usually destitute of any prominent or determinate leader.

The leaves are without the gloss of those of the beech, and are not unlike those of the elm; they are pointed and



doubly serrated, with numerous parallel, transverse, hairy ribs, and when expanding are beautifully crimped or plaited. The barren, or male catkins, are two or three inches long, loose and scaly, of a yellow colour; and the female catkins, which when young are covered with close brownish scales, become gradually enlarged, "and," as Sir J. E. Smith describes them, "form unequally three-lobed, sharply-serrated, veiny, dry, pale green bracteas, each enveloping an angular nut, scarcely bigger than a grain of barley."



The trunk of the Hornbeam is rarely, in trees of above twenty-five or thirty years' growth, found of a round or regular form, but appears twisted, and as it were composed of several stems, grown or united together; this peculiar growth, it would seem, arises from the irregular deposition of the annual layers which, instead of being deposited in regular circular lines, as in most other trees, are undulated or zigzag, at the same time that the medullary or transverse rays are stronger and wider apart.

The Hornbeam is indigenous to a great part of England, and abounds in Essex, Kent, Norfolk, &c.; it is also

common in parts of Wales, in Lancaster, and the north midland counties; it does not, however, extend to the northernmost counties, nor do we think it is truly indigenous to Scotland, although Sir J. W. Hooker includes it in the "Flora Scotica," as we have never met with or seen it in natural woods, or in situations where it appeared to grow native, but always where it seemed to have been artificially introduced. It is also a native of Ireland. Its range upon Continental Europe is very extensive, and reaches northward as high as 55° and 56° N. L. In Asia it is found in the Caucasus, Western Asia, and Asia Minor, but is not met with upon the African Continent.

By the Greeks it was considered a kind of maple, and like it went under the name of *Zeugia*, the wood of both trees, from the tenacity of their fibre, being employed for making the yokes for oxen. By the Romans it does not appear to have been held in much repute, as no mention is made of it by Virgil or other poetical authors. Pliny describes it under the name of *carpinus*, by which title it is also alluded to by Vitruvius. Amongst our early writers it is described by Gerard as "very like unto the elm or wich-hasell, having a great body, the wood or timber whereof is better for arrows and shafts, pulleys for mills, and such like devices than elm or wich-hasell, for in time it waxeth so hard, that the toughness and hardness of it may be rather compared to horn than unto wood, and therefore it was called Hornbeam, or Hardbeam." By the author of "An Old Thrift Newly-revived," it is classed among the British timber trees, and he says "it doth much resemble the beech tree in quality." Parkinson, in his "Theatre of Plants," considers it to be the *Ostrya* of Theophrastus, and he so names it. Evelyn, after enumerating several of the uses to which its timber

was applied, eulogizes its adaptation for topiary works, and particularly mentions the Hornbeam hedges in the nursery-garden of London and Wise, at Brompton; he also adds, "that admirable espalier hedge in the long middle walk of the Luxembourg garden at Paris (than which there is nothing more graceful) is planted of this tree, and so is that cradle or close walk with that perplext canopie which covers the seat in his majesty's garden at Hampton Court."

In those days, when geometric gardening so generally prevailed, the Hornbeam, from its hardy nature, its patient endurance of the shears, the height to which it could be trained, and its quick growth, was very extensively used; in this style of gardening the ground was divided into compartments by Hornbeam hedges and palisades, and these again diversified by others arranged in various forms, amongst which the star, the goose-foot, the labyrinth, and the bosquet, were conspicuous; but as a detailed description of each of these would occupy more room than our work will afford, we refer our readers to the "Retired Gardener," where ample details for executing works of this description will be found.

A similar application of the Hornbeam existed, and indeed still partially exists, upon the Continent. In France, the *Charmille*, or trained Hornbeam hedge, was very common, and Hunter, in his edition of Evelyn, describes from Agricola, a German author, the mode of making a strong Hornbeam fence or hedge, by planting the sets so as to form a cross, XX, and then, after scraping off a little of the bark of both sets where they touch each other, binding them together, an operation which speedily causes the two plants to unite and form an impenetrable living *chevaux de frise*.

As an ornamental tree, even in its highest state of developement, it is inferior to the beech, its outline being hard, formal, and lumpy from the rounded and closely-matted nature of its head; its pretensions to picturesque effect, therefore, are very slight, and it is only for the variety it produces when planted with other trees, and the shelter it affords, that we can recommend its admission into ornamental grounds, or what is called landscape gardening. As a nurse, however, to other trees, in plantations where profit is the object, we are inclined, from the observations and the trial we have made, to think more favourably of the Hornbeam than the encouragement it has hitherto received seems to warrant.* Its natural habit, which affects cold, stiff, clayey soils, points to it as a fit tree in all districts where soil of this nature intended to be planted prevails; upon such, therefore, it may form a constituent of one of the combinations we have recommended, and, in addition to the portion intermingled with the other trees, might be planted so as to form a belt of shelter, perhaps even more effective than that of the Scotch or any other fir, as by proper management and trimming it might be converted into a lofty and impenetrable hedge. Nor would it as a nurse or intermediate occupant be less profitable than many of the trees we are accustomed to introduce, as we find that its growth is nearly on a par with that of the beech, the elm, the sycamore, and the ash, and its wood, in the form of thinnings, when it has attained the age of twenty-five or thirty years, equally as valuable as that of most of the trees abovementioned at the same age, (much more so than that of the beech), as we find besides other pur-

* Boutcher recommends it as a nurse, and considers it as one of the fittest plants to encourage and protect valuable delicate trees.

poses, it makes excellent barrel staves for the fish-curers, the demand for which is now very great, and annually increasing, and is adding greatly to the value of woodland; as the thinnings which previously, with the exception of the larch, did little more than repay the cost of cutting down, now make a large return, particularly in those instances where the proprietor cuts up the wood himself by means of the circular saw.

The wood of the Hornbeam is white, close-grained, very tough, but with little flexibility, hard, and heavy. It does not, however, take a good polish, and from the disposition of its fibres is what is called cross-grained, and difficult to work or make smooth under the plane. For cogs of wheels it is the best wood that can be used, excelling, according to Evelyn, either the crab or the yew; but as iron wheels and machinery are now almost universally substituted for those of wood, its application to this purpose is nearly at an end. Its strength and tenacity is shown in the trial recorded by Loudon, where a piece of Hornbeam, two inches square and seven feet eight inches long, supported a weight of two hundred and twenty-eight pounds, while a similar one of ash broke under two hundred pounds, one of birch under one hundred and ninety pounds, of oak, under one hundred and eighty-five pounds, of beech under one hundred and sixty-five pounds, and of all other woods under a much less weight. As a fuel it stands in the highest rank, emitting much heat, burning long and with a clear bright flame, or as Boutcher expresses it "like a candle, and easily lighted." Its charcoal is also highly prized, not only for culinary purposes and the forge, but for the manufacture of gunpowder, into which, upon the Continent, it enters in large proportion.

As already observed, the Hornbeam thrives best upon

a soil of adhesive nature, and is naturally found in cold clayey districts; it attains its greatest dimensions in stiff soils of moderate quality, and never thrives upon land of a dry gravelly nature or upon chalk. When propagated in the nurseries, which is done to a very moderate extent as compared with other forest-trees, it is by seed, which ripens in the autumn, and ought to be gathered when ready to fall to the ground. If sown immediately, a portion will vegetate the following spring, the remainder not till the second spring, which is also the case with all the seed kept in dry sand over the winter months. From the seed-beds they are transplanted into nursery-rows, whence, in the course of two or three years they may be removed to their permanent stations. Lopping and pruning of the Hornbeam ought never to be practised in spring, as it suffers injury from excessive bleeding; at other times it may be done without injury, and no tree is more patient of the knife. It seems subject to few diseases, and, from the tough and wiry nature of its branches, and the firm hold it obtains of the ground by its numerous and deep-descending roots, is rarely injured by storms of wind. The insects which feed upon it are not numerous, and the foliage is seldom severely injured by their attacks. Amongst the lepidopterous larvæ, which either wholly or partially subsist upon the leaves, are those of *Himera pennaria*, *Hybernaria prosapiaria*, *Geometra carpiniaria*, *Campœa margaritata*, which belong to the Geometridæ. The larva of *Tenthredo carpini* also feeds upon the leaves, and one of the scale insects (*coccus*) infests the stems and branches of the trees.

In addition to the list contained in the "Arboretum Brittanicum," where several trees, measuring from fifty to seventy feet high, with trunks of six or eight feet in cir-

cumference are recorded, we may mention several specimens at Brocket Hall, the seat of Viscount Melbourne, averaging upwards of six feet in circumference at three feet from the ground, forty feet in height, and with a head whose diameter measures nearly seventy feet. At Twizell, twenty-seven years planted, it is three feet in circumference at eighteen inches from the ground, and upwards of thirty feet high.





ORD. *Platanaceæ.*

Genus *Platanus*, LINN.

LINN. *syst. Monœcia Polyandria.*

Platanus orientalis. LINN.

THE ORIENTAL PLANE.

Platanus orientalis,

WILLD. sp. pl. iv. p. 473.
Hort. Cliff. 447.
MILL. Dict. No. 1.
Hort. Kew. iii. p. 364.

THE specific characters which distinguish the Oriental Plane from the occidental species, are, leaves five-lobed,

palmate, and wedge-shaped at the base, the divisions lanceolate and sinuated; stipulas almost entire.

For beauty and nobleness of aspect the Platanus yields to no other tree in the East; to a lofty height it adds a massive trunk and wide-spreading head, which, at the same time that it affords a delightful and almost impenetrable shade, does not offend the eye by any of that lumpish regularity of outline, which so often characterizes the sycamore, the horse-chesnut, and the lime-tree. The branching of the Plane is free and bold, and often in tier-like masses, and the spray, from its crooked and zigzag course, is devoid of formality, and, indeed, is often picturesque. The trunk is covered with a smooth bark of a greyish white colour, which scales off every year in large irregular patches, often producing a pleasing variety of tint. The leaves are large, cut into five deep segments, the two outer of which are slightly lobed, and all have their margins acutely indented. The petioles are rather long, with an enlargement at the base which covers the nascent buds. On the upper surface the leaves are of a pleasant shining green, the under surface is paler, with the angles of the veins slightly tomentose. The catkins which contain the seed are of a globular form and from two to five in number, on axillary peduncles; they vary greatly in size, and are found from four inches to scarcely one in circumference. The flowers are very minute. The balls appear before the leaves in spring, and the seed ripens late in autumn; these are small, and not unlike the seed of the lettuce, and are surrounded or enveloped in a bristly down.

Although this beautiful and classic tree appears to have been introduced into England nearly three hundred years ago, as it is mentioned by Turner in his "Names of

Herbes" as early as 1541, it never seems to have been encouraged to the extent it deserves, even as an ornamental appendage to the residences of our gentry, and the specimens now in existence are neither very numerous nor are they distinguished for their dimensions, at least as compared with those gigantic Planes which are met with in Greece, Persia, and other native habitats of the species. Whether this apparent neglect of the Oriental Plane has arisen from a supposed delicacy of constitution, (though, in fact, it is found to be hardier than the occidental species,) from its frequent failure, in consequence of having been planted in unfavourable soil, or from a like liability to suffer from late severe spring-frosts, which at intervals have proved so fatal to the American species, does not appear, though it is probable that these circumstances combined have created a prejudice against it and prevented its more extended distribution.

In the south of England and around London, where specimens are most numerous, the largest trees mentioned by Loudon seem to have attained a height of from seventy to ninety feet, and a diameter of trunk of from three to upwards of four feet. The oldest recorded British specimen is that at Lee Court in Kent, which was seen by Evelyn in 1683, and was then a fine tree; a portrait of the same was given by Mr. Strutt in his "Sylva Britannica," and its dimensions were found by that gentleman to be as follow;—circumference at six feet from the ground fourteen feet eight inches, height sixty-five feet. In the north of England it is rarely seen, and few attempts are made to rear it, though its occidental congener is often planted in ornamental grounds. In Scotland it grows as far north as Ross-shire, where a tree fifty feet high, with a trunk of two feet in diameter, is mentioned by Loudon, growing

at Brahan Castle: healthy specimens in the neighbourhood of Edinburgh are also mentioned, and in Ireland it seems to grow vigorously, and at as rapid a rate of increase as it does in England.

The Oriental Plane is indigenous to Greece, and other parts of the Levant, and is also a native of Persia, extending, according to Royle,* as far south as Cashmere; it is also found in Asia Minor. Being a tree of no great power of occupancy it is rarely found in numbers together or forest-like, but usually growing single or in detached groups, and, as it requires a deep, rich, and rather moist soil to attain its full developement, is always found of the greatest magnitude upon rich, alluvial plains, and in the vicinity of running water. Such were the situations where those enormous Plane trees grew mentioned in the earliest records of Greece, one of which, as we learn from Herodotus,† so delighted Xerxes, when he invaded Greece, by its colossal form and shade, that he encircled it with a collar of gold and committed it to the especial care of one of the ten thousand. To this account, Elian adds, that an entire day was spent by Xerxes beneath its shade, a delay of portentous consequence to Greece, as it was one among other causes that contributed to the subsequent defeat of the mighty armament of the Persian king. Another Plane, remarkable for its size and beauty, which grew in Arcadia and was said to have been planted by the husband of Helen, is recorded by Pausanias, who saw it when it was supposed to be one thousand three hundred years old. Pliny, also, mentions that, in his time, a Plane tree was shown in Phrygia, against which the inhabitants affirmed Marsyas was suspended when flayed by

* See Royle's illustrations.

† Herod. Bib. ἡ πολύμνια, sec. 31.

Apollo. The same author, also, mentions the famous Plane of Lycia, which grew near to a fountain by the highway side, itself a forest, and in the hollow of whose mighty trunk the Roman governor Licinius Mucianus, accompanied by eighteen of his attendants, had enjoyed a repast. At a later period magnificent examples of this umbrageous tree continued to flourish in Greece, and many of these are existing at the present day; one of the most celebrated is the enormous Plane at Buyukdère or the Great Valley, conjectured by M. de Candolle to be more than two thousand years old; when measured by Dr. Walsh, in 1831, it was found to be one hundred and forty-one feet in circumference at the base, and the diameter of its head covered a space of one hundred and thirty feet. Some doubt, however, seems to exist as to whether it should be considered as a single tree, or as a number of individuals which have sprung from a decayed stock and become united at the base. The hollow contained within the stems of this enormous tree, we are told, affords a magnificent tent to the Seraskier and his officers, when the Turks encamp in this valley. An enormous Plane, known to Chandler, is mentioned by Hobhouse,* growing upon the bank of the Selinus, near Nostizza; Buckingham describes the same tree as being fifteen feet in diameter and one hundred feet high, covered with rich and luxuriant foliage. In Persia, the Chinar or Oriental Plane has been cultivated from the earliest period for the delightful shade it affords, and to the present day it is planted in all the Persian gardens to form avenues and shaded walks, under which, also, the inhabitants prefer to perform their religious exercises. The Chinar and the poplar (*Pop. fastigiatus*) seem, with few

* Hobhouse, "Journal of Travels in Albania," p. 229.

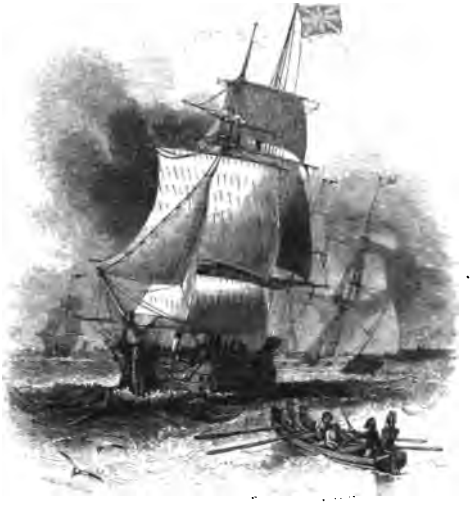
exceptions, to be the only trees that are met with in many parts of Persia, for Fraser, in his historical description of that country, published in 1834, when adverting to the general effect of Persian scenery, remarks, "that no trees gladden the landscape, except the tall poplar or the stately Chinar, which rise above the hovels of the peasants, or the fruit trees of their orchards, or perhaps a few other sorts which may have been planted on the margin of a water-course, to supply the little timber required; and these, dotting the wild plain with their dark foliage, convey to the mind a melancholy rather than a cheering impression."

Loudon remarks, that the Oriental Plane, as an ornamental tree, is much better adapted for pleasure-grounds and for planting near houses, than for extensive parks or for imitations of forest scenery; its character possessing a mildness of expression, combined, at the same time, with a majesty and gracefulness of form, that peculiarly fits it for domestic scenery. Its foliage is beautiful, not only for the shape, colour, and texture of the leaves, but for the tufted or rather imbricated manner in which it is disposed, in consequence of the strata-like form the branches naturally assume; a disposition, it may be observed, which, at the same time that it produces those recesses which give an effective depth of shade, allows, during sunshine, the admission of rays sufficient to create those flickering lights, which divest the tree of that character of heaviness which offends and tires the eye, in such trees as present an unbroken and regularly-rounded outline. As timber, the wood of the Oriental Plane is almost unknown thoughout the greater part of the south and west of Europe, but in Greece, Persia, and other native habitats it is extensively used, not only in cabinet work, but in

common carpentry and joinery. Olivier tells us that its wood is equal to that of any European tree for cabinet-making, and that it is almost exclusively employed by the Persians for their furniture, doors, windows, &c.

When young, the wood is of a yellowish white colour, but as it acquires age becomes brown, streaked with reddish veins, and when polished is not unlike the wood of the best walnut. To rear the Oriental Plane in England, and see it acquire dimensions at all corresponding to what it attains in its native districts, it ought to be planted in a rich, light, free soil, sufficiently moist, but not water-logged or wet at bottom. The situation should be well sheltered and warm, not too much shaded or crowded by other trees; neither should it be in very low damp bottoms, as in such the late spring frosts, which have proved so injurious to this but more frequently to the occidental species, are always more severe in such localities than in more airy situations. By our nurserymen it is commonly propagated by layers, as these produce strong and saleable plants within a shorter period than cuttings, which do not root so freely as those of the occidental species. Seed also may be procured from abroad, and plants so raised we should prefer to either of the other methods. The balls or catkins in which the seed is contained are fit to gather in October or November, and the seeds, as soon as extracted and freed from the down, should be either sown immediately in beds of rich well-pulverized earth, and slightly covered or merely beat down by the back of the spade, with some lumber or litter thrown over them to keep out the frost, or they may be kept till March or the beginning of April, mixed with sand, in a situation secure from frost. In two years the seedlings will be fit to run into nursery rows, from

whence they may be planted into their permanent stations in two or more years according to the size considered most advantageous and most likely to succeed by the planter.





Platanus occidentalis. LINN.

WESTERN PLANE.

Platanus occidentalis, WILL. sp. pl. iv. 495.
MILL. Dict. No. 11.
Nov. du Hamel ii. p. 5.

Button-wood, Cotton tree, Amer.

The specific characters of the Occidental Plane, according to Willdenow, are, leaves five-angled, obsoletely lobed, dentate, wedge-shaped at the base, the under surface downy.

In treating of trees which, like the Planes, resemble each other in magnitude, form, and general appearance, and in which this resemblance is so obvious as often to cause them to be confounded together, it seems necessary to point out the discriminating characters by which the one species can always be distinguished from the other. In the Oriental Plane, fig. 1, the leaves are smaller and much more deeply lobed, or divided into segments, than in the Western tree, fig. 2, and the petioles of the leaves,



Fig. 1.



Fig. 2.

which in the Oriental species are green, in the American tree are purplish red; the fruit, or ball-shaped catkins also of the Occidental Plane are larger and not so rough externally as those of the other. In magnitude it fully equals if it does not surpass the Oriental Plane, as its height is usually greater and its stem bulky in proportion. Even in England, specimens of the Occidental Plane of no great age are to be met with one hundred feet high. The beautiful tree growing in the palace garden at Lambeth had, we are informed by Loudon, in 1837, at forty

years' growth, reached that lofty elevation, and another in Chelsea Garden, planted by Miller, was then estimated at upwards of one hundred and fifteen feet in height; from these instances and many others that might be adduced, it is evident that the growth of this species, when planted in appropriate situations, is more rapid than that of its eastern congener. In America, upon the rich banks of the Ohio, and other great western rivers, where it luxuriates in a deep moist soil, enriched by the annual slimy deposits of their waters, and by the yearly recurring layers of fallen leaves, the American Button-wood attains a magnitude and height which constitute it, as Michaux informs us, "the loftiest and largest tree of the United States." This author mentions a Button-wood tree that his father met with, growing on a small island in the Ohio, about fifteen miles above the mouth of the Muskingun, which, at five feet from the ground, measured forty feet four inches in circumference; and he himself, on a journey through the western states in 1802, found, on the right bank of the same river, another Button-wood of still more enormous dimensions, its girth, at four feet from the ground, being forty-seven feet, or nearly sixteen feet in diameter. This tree, which showed no symptoms of decay, but on the contrary exhibited a rich foliage and vigorous vegetation, began to ramify at about twenty feet from the ground, a stem of no mean length, but short in comparison to many large trees of this species that he met with, whose boles towered to a height of sixty or seventy feet without a single branch.

The American Plane is distributed over a great portion of the North American Continent, but is confined by its nature, so Michaux tells us, "to moist and cool grounds,

where the soil is loose, deep, and fertile;" and he adds, "it is never found upon dry lands of irregular surface." It was first introduced into England about two hundred years ago, and in consequence, it would appear, of its more rapid growth and easy propagation by cuttings, had, in Evelyn's time, become much more common than the Oriental Plane, which it had then nearly supplanted; and even at present it continues to be planted in preference to the other, though it is evident from the fatal effects produced by the severe spring frost in the month of May 1809, and by the severe winter of 1813 and 1814, that it is in reality of a more delicate constitution, and less able to bear the vicissitudes of our climate, than its oriental congener. In the year and month first named, a severe frost destroyed the tender shoots and leaves, just then bursting from their envelopes, of most of the largest trees of the Occidental Plane in England and Scotland, and though some which were not killed by the first attack, made an attempt to push again late in the season, the feeble shoots they emitted were again destroyed by an early autumnal frost; this sealed their doom, as nature was too much exhausted to make a successful effort the following spring, and they speedily died.

In Scotland, where trees of both species were standing near to each other, the Oriental escaped; and Sang, in the "Planter's Calendar," p. 99, observes, "It is very singular that of the *Plat. Occidentalis* the largest trees only were killed; trees of from twenty to twenty-five feet in height were little hurt, and small ones not at all, at least in every instance that came under our observation;" and he adds, "we did not observe or hear of a single Oriental Plane being injured in any part of

the country."* Again the winter of 1813 and 1814, remarkable for the severity of its frost, proved fatal to most of the large Occidental Planes that had escaped in 1809, a circumstance that fully accounts for the rarity of trees of this species throughout the kingdom of any extraordinary dimensions or advanced age at the present time.

As an ornamental tree the Occidental is in no way inferior to the Eastern Plane. Its stem exhibits the same picturesque effect, as its bark is equally liable to scale off, and the tints thus produced by the contrast of colour of the new and old bark, offers to the pencil, as Gilpin observes, "those smart touches which have so much effect in painting." The same author remarks, "that no tree forms a more pleasing shade than the Occidental Plane. It is full-leaved, and its leaf is large, smooth, of a fine texture, and seldom injured by insects. Its lower branches shooting horizontally soon take a direction to the ground; and the spray seems more sedulous than that of any tree we have, by twisting about in various forms, to fill up every little vacuity with shade."

The timber of the Occidental Plane may be said to be scarcely known in England, as it has hitherto only been planted for its ornamental properties, and never with a view to profit; from Michaux we learn that, though of a close grain and susceptible of a high polish, it cannot, from its liability to warp, be used for delicate cabinet purposes, but is made into bedsteads and other bulky articles; its colour when old is dull reddish brown, and the medullary rays, extending from the centre to the circumference, and which divide the concentric rings into

* For a further account of the destruction of the Occidental Plane in various parts of England by the frost of 1809, our readers are referred to the "Gentleman's Magazine" for 1810 and 1813.

numerous sections, are very distinct and visible. Exposed to the weather or to the alternations of moisture and dryness, it quickly decays, and its qualities as a fuel are only of secondary order, as it neither gives much heat nor a bright flame, nor does it yield much charcoal.

The usual mode of propagation in this country is by layers or by cuttings, which root as freely as those of the willow; it is also sometimes raised from seed imported from America in the globular catkins, and in this way Cobbett stocked his nursery for some years. In his account of the treatment of the seed, previously to and after being sown, contained in his "Woodlands," we find that, after breaking the balls by hand and separating the down from the seeds, he soaked the latter in lukewarm water for forty-eight hours, they were then mixed with finely-sifted fresh earth, ten gallons of earth to one gallon of seeds: the mixture, being put upon a smooth place on the bare ground was turned and remixed every day for four or five days, keeping it covered with a mat whenever the turning and mixing was not going on, and as soon as a root began to appear here and there the seeds were sown upon a bed of sifted earth, mixed with the sifted mould, just as they came out of the heap. No further covering of earth was given them, but they were shaded from the sun by mats during the day, watered with a fine-rosed watering-pot in the evening, about which time the mats were taken off for the night. In about a week most of the seeds had germinated, and shortly afterwards the cotyledons appeared. The young plants were then inured by degrees to the sunshine, till they were hardy enough to be exposed during the whole of the day. In October they had ripened their wood, and the next season were fit to run into nursery rows.

In the list of existing trees recorded in the "Arboretum Britannicum," we find, as might indeed be expected from what we have already stated in regard to the destruction caused by the frosts of 1809 and 1813—14, none of any great age or extraordinary dimensions, but several which show a great rapidity of growth when planted in a suitable soil; amongst the finest are the two trees already alluded to, the one growing in the palace gardens at Lambeth, the other in the botanic garden at Chelsea. Another beautiful specimen of the *P. Occidentalis*, and of large size, stands in the park at Cheply, Somersetshire; it measures twelve feet in circumference at three feet from the ground, with a well-balanced wide spreading head. At Twizell, about twenty years planted, it is four feet in circumference at one foot six inches from the ground, and about forty feet high, the situation a good alluvial soil upon the brink of a rivulet.

Both species of Platanus in this country seem equally free from the attacks and ravages of insects, and, in consequence, their foliage is never injured or defaced; it would also appear that, in their native habitats, the insects that infest them must be few, as the foliage and aspect of the two species are always described as luxuriant, beautiful, and affording the deepest shade.



ORD. *Taxaceæ.*

Genus *Taxus*, LINN. LINN. *Syst. Dioecia Monadelphia.*

Taxus baccata. LINN.

COMMON YEW.

Taxus baccata,

LINN. sp. pl. 1472.
NOV. DU HAM. i. p. 62.
SMITH's Eng. Flor. iv. 252.
HOOKER's Brit. Flor. p. 434.
MACKAY's Flor. Hibern. p. 259.
LINDL. Syn. p. 241.
LOUDON's Arb. Brit. ch. cxii. p. 2066.

Specifically the Common Yew is distinguished by having its leaves 2-ranked, naked, linear, and flat; the receptacle of the barren or male flowers globular. The outline of this tree, during its period of growth, is pyramidal or broadly conical, the summit presenting a pointed or peaked appearance, nor does it lose this form or become round-headed for many years, indeed, not until it has attained its utmost growth, and incipient decay in the topmost branches marks the period when it has passed maturity, a condition it frequently does not arrive at, before several centuries have been numbered. It grows with a stiff erect stem, short in proportion to its bulk, and, when left to its natural growth, numerous nearly horizontal branches spring



from within a very short distance of the ground; these, if left unmolested, annually elongate, and at length cover with their umbrageous spray a large space of ground. The trunk, as well as the larger branches of the Yew, are seldom if ever seen perfectly round or smooth, but are deeply grooved longitudinally, much in the same manner as the trunks of the hornbeam and the Lombardy poplar; they are covered with a thin bark of a rich red-

dish brown colour, which exfoliates and peels off in patches like that of the Platanus. The leaves, about an inch in length and placed in two lateral rows, are of a linear shape, nearly sessile, their upper surface of a deep glossy green, but paler, and with a prominent midrib beneath.

The flowers are solitary, proceeding from a scaly axillary bud; those of the male plant are pale brown, and discharge a very abundant yellowish white pollen. The female flowers are green, and in form not unlike a young



acorn. The fruit when ripe consists of a scarlet berry, very sweet to the taste though mawkish in flavour, and of a glairy or glutinous consistence, open at the top and enclosing a small, oval, brown, hard-shelled seed or nut, which, though surrounded by, is not immediately connected with, the fleshy cup. The kernels of these nuts are not deleterious, as supposed by many, but may be eaten with impunity, and they possess a sweet and agreeable nutty flavour.

The Yew is indigenous to Britain, growing naturally in various parts of England and Scotland, and particu-

larly affecting rocky and mountainous wooded districts. It is also found in similar situations in Ireland, advancing to as high a range as twelve hundred feet. It seems to prefer a northerly or cool aspect, and grows freely under the shade of many deciduous trees. The soil most congenial to its growth is that of a stiff calcareous nature, and where it is kept pretty moist by the percolation of water or the shade of surrounding trees and herbage. It is not, however, a tree of much power of occupancy, being seldom found growing in large masses together, but usually solitary or intermingled with other trees. It is also indigenous to the greater part of continental Europe, and to parts of eastern and western Asia, and should the *T. Canadensis* be only a variety of *T. baccata*, as supposed by Loudon, in that case its distribution extends to the North American continent. Like most trees of slow growth, tardy, at least, when compared with the rapid advance of many of our deciduous species, as well as several of the Coniferæ, the Yew is long in attaining maturity, and many centuries frequently elapse before it shows any symptoms of decay, a fact we learn from the records of celebrated trees now extinct, as well as from others still in existence, and whose history can be traced for upwards of one thousand years.

In bygone times, when the Yew tree furnished that formidable weapon the long bow, so destructive in the powerful and skilful grasp of the English archer, and to the decisive effects of which we are said in a great measure to have been indebted for some of our proudest and most momentous victories, witness the fields of Cressy, Poictiers, Agincourt, &c., it was held in high and deserved esteem, and every care was taken to ensure its preservation and foster its growth; statutes having been

passed for these purposes in various reigns, as well as to forbid the exportation of a wood of such value and importance to the kingdom.

In this state of honourable distinction the Yew long continued; and it was not till the reign of Elizabeth, at which period the introduction of fire-arms began to be general and to supersede the use of the more primitive weapon, that the motives which had previously protected and encouraged its growth, and had given such value to its tough and elastic fibre, ceased to exist, or that those associations long connected with it were forgotten, and no longer exerted their influence in its favour. These feelings once at an end, the Yew seems to have fallen into a state of comparative oblivion and neglect, and so continued till Evelyn again brought it into a certain degree of repute, not, however, for the qualities which at an earlier period had given it such celebrity, but as an ornament to the gardens and pleasure-grounds of the gentry of his day, either for hedges of shelter and defence, or as ornamental appendages, when fashioned by the shears into the forms of birds, animals, cones, pyramids, and other fantastic devices. This practice of torturing the Yew into such a diversity of shapes continued to prevail for many years, or until the time of William III., when it yielded to the ridicule that was launched against it, and gradually gave way to the present less formal style of garden embellishment. Examples, however, of clipped Yew hedges and fanciful forms cut out of the living tree are still to be seen in some few of our oldest English flower-gardens; and, from the striking and peculiar effect they often produce, we are almost disposed to wish, with Mr. Loudon, that the taste was again, at least partially, revived, and introduced into some of the gardens of those Gothic and

Elizabethan villas which of late years it has been the fashion to erect.

Since the Yew ceased to be employed as a hedge plant, in the manner described, its cultivation has been greatly neglected, indeed, the prevalent feeling towards it has long been such as nearly to banish it from the precincts of our residences and pleasure-grounds; not, it would appear, from any valid objection that can be urged, either against its form or the effect it produces, but from the unfortunate habit (old and more interesting recollections being entirely forgotten,) of viewing it in the light of a funereal tree, and associating it with scenes of melancholy and the grave, a feeling no doubt arising from the fact of the tree being very frequently found growing in ancient churchyards, where many of our most venerable and celebrated specimens are still to be seen. Such a distaste towards the Yew is much to be regretted, as we consider it one of the most beautiful evergreens we possess, combining beauty of appearance with other valuable properties, such as a temperament hardy enough to brave our most inclement seasons, extraordinary longevity, and a constitution which enables it to thrive in soils of inferior quality. In this opinion we are not singular, for Gilpin speaks of it in terms of great commendation, and pronounces it, even in a state of nature, to be one of the most beautiful evergreens we have. "Indeed, (he says,) I know not whether it is not superior to the cedar of Lebanon itself—I mean of such as are representatives of that noble plant seen in England;" he also combats most successfully the objection often urged against the colour of its foliage, which, as consonant with our own sentiments, we quote in his own words. "An attachment to colour, as such, seems to me an indication of false taste. Hence arise

the numerous absurdities of gaudy decoration. In the same manner, a dislike for any particular colour shows a squeamishness which should as little be encouraged. Indeed, when you have only one colour to deal with, as in painting the wainscot of your room, the eye, properly enough, gives a preference to some soft pleasant tint, in opposition to a glaring bold one; but when colours act in concert, (as is the case in all scenery,) red, blue, yellow, light green, or dingy green are all alike. The value of each consists solely in its agreement with its neighbours."

Whether as an evergreen undergrowth or as a timber tree, the Yew is well deserving of a cultivation more extended than it has hitherto received. As an underwood, it is in our opinion scarcely inferior to the Holly, and only so in failing to produce those sparkling effects of light which distinguish the larger and more highly glazed dark green foliage of that plant; in hardihood it is its equal, and it bears, with the same comparative impunity, the drip and shade of many of our loftier deciduous trees, a quality of great importance where an evergreen underwood is desired. The great value and durable properties of its wood ought also to favour its introduction into our mixed plantations, even where profit is the chief object in view, and we should like to see it supplanting a certain portion of the evergreen Coniferæ, generally associated with the deciduous trees; for, though its progress is slower and a longer time would necessarily be required to bring it to a useful and marketable size, yet the additional value of its wood, in a great measure, would compensate for the tardiness of its growth. We may further remark that the Yew, thus situated and fostered by the shelter of surrounding trees, would be drawn up and grow much more rapidly

and with a cleaner stem than when isolated or standing exposed, and that much also might be effected towards a quicker growth by training the plants when young to a single stem, by eradicating supernumerary leaders, and shortening in the side branches where they appear to be too rampant or to detract from the nourishment that ought to go to the central stem. When thus planted, with a view to its timber, the Yew and the oak, as longest in attaining maturity, ought to remain as the ultimate crop upon the soil, such intermediate occupants as it might be thought necessary to plant along with them, whether consisting entirely of the Coniferæ or of a mixture of these with other deciduous trees, being gradually thinned out to give sufficient room and air to the survivors. Planted and treated in this way, the number of Yew plants required per acre would be comparatively few, and their cost (a matter of considerable importance when planting upon an extensive scale,) moderate, as it would not be necessary to place them nearer to each other than from thirty to forty feet.

We have already adverted in a cursory manner to the frequent occurrence of the Yew tree in ancient churchyards, where many of the finest and most venerable specimens are still in existence; the origin of the custom of planting them in this situation remains, however, a matter of speculation, as no ancient historic records refer directly to the subject, or explain why such deference was paid to this tree. In consequence of this want of information, various opinions have been broached by writers upon the subject. By some it is supposed to have been so placed to ensure its preservation from cattle and other injuries, as being a tree, in former days, of national importance for the fabrication of the English long bow; by others, as

intended to afford a supply of branches to the congregation on Palm Sundays; while others, again, have imagined that it was merely introduced as an emblem of silence and death. The most probable and comprehensive view that has yet been taken appears to be that of J. E. Bowman, Esq., F.L.S., contained in an article published in the first volume of the "Magazine of Natural History," new series, and which is free from the objections that may be urged against most of the other suppositions upon the subject, all of which appear to be too limited as to the time when it is supposed the custom first commenced; for there is little or no doubt but that Yew trees existed in places of Druidical worship previous to the erection of Christian churches upon the same sites, and the Rev. W. T. Bree, in the sixth volume of the "Magazine of Natural History," suggests the probability that churches were more frequently built in Yew groves or near old Yew trees, than that Yew trees were planted in the churchyards after the churches were built. Mr. Bowman also observes, "It seems most natural and simple to believe that, being indisputably indigenous, and being, from its perennial verdure, its longevity, and the durability of its wood, at once an emblem and a specimen of immortality, its branches would be employed by our pagan ancestors, on their first arrival here, as the best substitute for the cypress, to deck the graves of the dead and for other sacred purposes. As it is the policy of innovators in religion to avoid unnecessary interference with matters not essential, these, with many other customs of heathen origin, would be retained and engrafted on Christianity on its first introduction." Such, indeed, we find to be the case in regard to other existing customs whose origin is generally unknown, or, if known, confined to the learned

or the antiquarian ; as instances, may be cited the decoration of the interior of our churches and houses with sprigs of holly at Christmas, a custom derived from the heathens, and which originated in the celebration of the Saturnalia in pagan Rome. The suspension of the miseltoe bush, also, within the dwelling-house, which still prevails in some parts of England at the same period of the year, is supposed to be a vestige of Druidical rites which prevailed long anterior to the introduction of Christianity.

The wood of the Yew possesses qualities of first-rate excellence, being not only hard, compact, of a fine and close grain, and elastic, but susceptible of a very high polish and almost incorruptible. The colour of the matured wood is peculiarly rich, varying from shades of the finest orange red to the deepest brown, and near to the root and at the ramification of the branches it is marbled and veined in a way surpassed by few of the finest foreign cabinet woods ; the sap wood, also, which is white and of a firm and hard texture, may be worked up with the other kind, and thus add to the numerous shades of colour it exhibits. From the qualities above enumerated, the Yew may safely be pronounced, not only one of the most valuable among European trees for cabinet purposes, but scarcely, if at all, inferior to the most costly exotic woods that have been introduced ; unfortunately, from the neglect of not having been treated as a timber tree, or planted extensively with a view to profit, it is not, at present, to be procured in quantity sufficient to make it generally available for the larger articles of furniture, and its application is, therefore, restricted to the making of small tables, work-boxes, &c., when it is generally used in the form of veneers, or for inlaid work and the smaller

wares of the turner. Its extraordinary power of resisting decay and corruption is not, however, restricted to manufactured articles, or where it is protected from exposure to the weather or the alternation of moisture and dryness, as it is equally remarkable for its superior durability when exposed or used in exterior or out-of-door work; thus for piles, pumps, &c., the Yew will last longer than any other wood, and Gilpin gives the advice that, "where your paling is most exposed to wind or springs strengthen it with a post of Yew. That hardy veteran (he adds,) fears neither storms above nor damps below. It is a common saying, among the inhabitants of the New Forest, that a post of Yew will outlast a post of iron."

In France, Loudon mentions that the Yew is found to make the strongest of all wooden axletrees. Even the branches are of considerable value, making stakes and hoops of great durability, and the young shoots, stripped of their bark, may be woven into baskets much stronger and more lasting than those of the willow. Another valuable property possessed by the Yew, given on Boucher's authority, ought not to be omitted: it is, "that the wooden parts of a bed made of Yew will most certainly not be approached by bugs;" a knowledge consolatory to those who have Yew timber to convert to such a purpose, and who are subject to the attacks of this irritating and disgusting insect.

The wood of the Yew after being cut is long in becoming perfectly seasoned; yet it is said to shrink so little in drying as not to lose above $\frac{1}{18}$ part of its bulk, a property no doubt arising from the close and compact nature of its grain, the result of slow growth, and the thinness of the layers of wood that it annually deposits, two hun-

dred and eighty of these, according to Loudon, having been counted in a piece of wood of not more than twenty inches in diameter.

In the earlier part of our history the principal application of the wood of the Yew was to the manufacture of bows, long the most formidable weapon of the English, and in the management of which they always evinced superior skill; on this account, as we have already remarked, the tree was fostered and protected by our ancestors, and archery encouraged by the edicts of several of our monarchs. From authors who have written upon the subject we learn that the English bow, up to a certain period, was made of a single piece of wood, varying from four to six feet in length, the ends tipped with horn to retain the string, as at the present day, but without any felt or other substance wrapped round the middle to support the hand. Roger Ascham, the author of "Toxophiles," a curious and amusing treatise on this subject published in 1544, tells us that "every bowe is made of the boughe, the plante, or the boole. The boughe is knotty and full of pruines; the plante is quick enough of caste, but is apt to break; and the boole is the best." He afterwards gives the following directions how to select a bow:—"If you come into a shoppe and fynde a bowe that is small, longe, heavye, stronge, lyinge streighte, not wyndynge, nor marred with knottes, gaule, wyndshake, wem, freat, or pinch, bye that bowe on my warrant." When fire-arms became more generally introduced, and the bow ceased to be used as a war weapon, the cultivation and care of the Yew seem to have been speedily abandoned, as wood fit for the manufacture soon after appears to have become very scarce, for we find that towards the end of the sixteenth century, in consequence of this de-

ficiency, bows composed of two or more pieces of different woods, were invented by a bowyer of Manchester, named Kelsal, who, retaining the belly of the bow of Yew, backed it with ash, or some other wood of elastic fibre. Up to the present day this mode of making the bow is very generally practised; but as various exotic woods from South America, and other parts of the world, have been introduced, possessing even superior qualities for the manufacture, the Yew is rarely used, not on this account alone, but from the difficulty of obtaining a supply of its timber fitted for the purpose.*

Of the deleterious and poisonous nature of the foliage and bark of the tender shoots of the Yew, both to human beings and to certain animals, there can scarcely be a doubt; repeated and well-authenticated instances of fatal effects having occurred after having taken them, not only in this country, but also in France and other parts of the Continent. It appears, however, in regard to animals, that it is only when taken in quantity or unmixed with other food that the effects prove fatal; for in a course of experiments made by Professor Wiborg of Copenhagen, it was shown that although the leaves, when eaten alone, were particularly fatal to horses, when mixed with twice or thrice the quantity of oats they could be given without danger. Loudon also mentions that, in the mountains of Hanover and Hesse the peasants feed their cattle in part with the branches of the Yew during winter; but knowing the poisonous nature of the tree, they commence by giving a very little at first, mixed with other forage, afterwards they gradually augment the quantity, until at last

* To those interested in archery, we refer our readers to Mosley's Essay on this subject, and "Roberts's English Bowman," or "Hints on Archery," published in 1801.

they can almost give them the leaves alone without danger. To goats, hares, rabbits, and sheep it is said to be quite innoxious, indeed we have repeatedly seen the three latter animals browsing upon it with apparent impunity; this, however, might possibly arise from the small quantity eaten at one time, or from having previously partaken largely of other food, which, it has been shown, neutralises the poisonous property, and this seems to account for the fact that cattle and sheep have been known to pasture without any dangerous consequences where Yew trees were accessible to them, and which showed evident signs of having been severely browsed.

The berries do not partake of the poisonous quality of the plant, as the sweet mucilaginous cup which surrounds the nut, as well as the kernel of the latter may be eaten without danger. They are a favourite food of the *Merulidæ*, or thrush tribe, and the female trees are eagerly resorted to by the Missel Thrush, Blackbird, &c., as soon as the fruit begins to acquire its scarlet tinge. Wasps, also, are said to prefer the fruit of the Yew to that of the vine, and under this impression Mr. Knight, in the "Horticultural Transactions," suggests the advantage of planting female Yew trees in the immediate vicinity of vineries.

As a short notice of some of the most celebrated Yew trees, remarkable for their antiquity, dimensions, or other peculiarities, may not be uninteresting to our readers, we shall proceed to select a few from the lists now before us. Commencing, therefore, with those already recorded by former writers, we pass to the Crowhurst Yew, growing in Crowhurst churchyard, close to the ruins of the abbey, which, in Evelyn's time, had a trunk ten feet in diameter. At the present day the trunk is hollow, but it still carries a noble and flourishing head. The Yew trees at Foun-

tains' Abbey are also celebrated for their size and age, having been trees of no mean dimensions when the abbey was founded in 1132, as we gather from the tradition handed down, viz., that the monks who built the monastery resided beneath the shelter of these very Yews during the time of its erection. One of them is beautifully figured in Strutt's "Sylva," and of their dimensions some idea may be formed from the fact that the trunk of one of them is nearly twenty-seven feet in circumference at three feet from the ground:—the Ankerwyke Yew, supposed to be upwards of one thousand years old, within sight of which Magna Charta was signed, and under whose shade Henry the Eighth is said to have made his appointments with Anna Boleyn while she resided at Staines. This tree is also beautifully figured by Strutt, who quotes the following lines:—

> "There, too, the tyrant Henry felt love's flame,
> And, sighing, breath'd his Anna Boleyn's name.
> Beneath the shelter of this Yew tree's shade
> The royal lover woo'd the ill-starr'd maid.
> And yet that neck, round which he fondly hung,
> To hear the thrilling accents of her tongue;
> That lovely breast on which his head reclin'd,
> Form'd to have humanis'd his savage mind,
> Were doom'd to bleed beneath the tyrant's steel,
> Whose selfish heart could doat but could not feel."

In Ifley churchyard, near Oxford, is another very ancient Yew, the trunk of which is now nearly reduced to a shell, but which still carries a flourishing head; it is supposed to be at least coeval with the church, whose date is believed to be prior to the Norman Conquest. In the churchyard of Dibdin, New Forest, Sir T. D. Lauder mentions a Yew tree which measures above thirty feet in girth above the roots. The Buckland Yew, growing in Buckland churchyard about a mile from Dover, a description

of which is given by the Rev. W. T. Bree, in the sixth volume of the "Magazine of Natural History," is apparently a tree of very great antiquity, and of very curious formation and grotesque appearance; the latter seems in a great measure to have been caused by the shattered condition to which it was reduced by lightning about the middle of the last century. A figure of its interesting remains is given in the "Arboretum Britannicum." An enormous Yew, with a hollow trunk of thirty-seven feet in circumference, stands in the churchyard of Tisbury, in Dorsetshire; Sir T. D. Lauder, in his edition of "Gilpin," mentions that "seventeen persons lately breakfasted in its interior." The tree is entered by means of a rustic gate.

The Tytherly Yews, two trees growing in the churchyard at Queenwood, near Tytherly, in Wiltshire, are upwards of five hundred years old. The largest is twenty-eight feet high, with a trunk three feet six inches in diameter. Loudon mentions that in the same wood there are two avenues of Yew trees, one of four hundred and fourteen yards long, consisting of one hundred and sixty-two Yews, supposed to be about two hundred years old. They average a height of thirty feet, with trunks two feet in diameter at two feet from the ground. The other avenue, planted upwards of one hundred and sixty years ago, and about four hundred yards long, consists of one hundred and twenty trees, averaging about twenty-four feet high, with trunks nearly two feet in diameter.

In Harlington churchyard, between Brentford and Hounslow, Loudon refers to a Yew not only remarkable for its size, but for having once been clipped into a regular form; a print of the tree in that state appeared in 1729, a copy of which is given in the "Arboretum Britannicum," to which we refer our readers; this tree is stated to be

fifty-eight feet high, with a trunk nine feet, and a head fifty feet in diameter. In the churchyard of Darby in the Dale, Derbyshire, stands the Darby Yew, the circumference of whose trunk, at four feet from the ground, is thirty-one feet eight inches. At seven feet above the ground it forks into two nearly upright boughs, which rise to the height of fifty-five feet. This tree is a female. Wales also contains Yews of very ancient date and huge dimensions; amongst them, the Gresford Yew stands preeminent for its beauty of form and magnificent appearance; it grows in the south-east corner of Gresford churchyard, near Wrexham, Denbighshire, and has a circumference a little below the divarication of the branches of twenty-nine feet, and, at the very base, of twenty-two feet. Its height is fifty-two feet, and the circumference of its head would appear to be upwards of one hundred and sixty feet. The Mamhilad Yew, a female tree in the churchyard of that name, a few miles north of Pontypool, shows, from the hollowness of its trunk, and the growth of a large tree, apparently detached within the central cavity, an extraordinary antiquity, as does likewise the Llanthewy Vach Yew, which, like the former, has a hollow trunk with a lateral opening, and capable of containing five or six persons. It has also, in the centre, a still more remarkable inner trunk covered with bark, and this is detached and distinct from the old trunk below, though united to it above by a branch running into, or more probably proceeding from it. This singular formation of interior trunks within the hollows of more ancient trees, seems satisfactorily accounted for in an article published in the first volume of the new series of the "Magazine of Natural History," where the author observes, "that when the top of the trunk becomes injured

and cracked by the action of storms upon the boughs, rain finds access and causes decay, and the dead leaves, and dung of bats, birds, &c., falling in, combine, with the rotten wood, to form a soft and rich mould, into which a bud shooting out from a neighbouring part (if not actually covered by the mould,) is naturally drawn by the moisture and shade, and transformed into a root, and which root, as the fissure widened and deepened by the slow but sure process of decay, would descend and thicken till it ultimately fixed itself in the soil below. After a lapse of perhaps several centuries, decay gradually advancing would at last reach the circumference of the trunk, and produce a rift on the side; through this the rotten mould would fall out, gradually exposing the root it had inducted downwards, which, in consequence of the combined influence of light and air acting upon it, would forthwith begin to deposit annual layers of true wood, and to be covered with a true bark. In the mean time it would have shot up a stem near its point of union, and have formed for itself an independent head and branches."

In the parish of Riblesford, near Bewdley, Worcestershire, mention is made in the first volume of the "Analyst," p. 81, of a fine Yew tree growing out of, and nearly filling the hollow of a pollard oak, whose circumference near the ground is seventeen feet. Both trees are clothed with numerous branches, which make a fine appearance; "the dark green foliage of the Yew towering above the boughs of its ancient companion." In this case the seed of the Yew seems to have been deposited in the decaying top of the pollard, where it vegetated, and continued gradually to send down its roots till they penetrated the ground below.

Scotland, also, can boast of very remarkable Yew trees,

among which, that in the churchyard of Fortingal, situated at the entrance of Glen Lyon, in Perthshire, is one of the most ancient and venerable, and, as Dr. Neill remarks, in all probability was a flourishing tree at the commencement of the Christian era. It was first described by Daines Barrington, in the "Philosophical Transactions" in 1769, and he then stated its circumference to be fifty-two feet. Some years afterwards it was seen by Pennant, who found the circumference increased to fifty-six feet six inches. Dr. Neill, who visited it in 1833, observes, in his notice contained in the "Edinburgh Philosophical Journal" of that date, that "considerable spoliations have evidently been committed on the tree since 1769; large arms have been removed, and masses of the trunk itself carried off by the country-people, with the view of forming *quechs*, or drinking cups, and other relics which visitors were in the habit of demanding. What still exists of the trunk now (1833) presents the appearance of a semicircular wall, exclusive of the remains of some decayed portions of it which scarcely rise above ground. The side of the trunk" (he adds) "now existing, gives a diameter of more than fifteen feet, so that it is easy to conceive that the circumference of the bole when entire should have exceeded fifty feet." Inch Lonach in Loch Lomond, commonly known by the name of the Yew tree Island, was formerly covered with a wood of these trees, and Sir T. D. Lauder specifies two individuals upon it, which, when measured, in 1770, were found, the one upwards of ten feet, the other thirteen feet in circumference. Subsequent to this date the produce of the island was doomed to the axe, and three hundred beautiful Yew trees cut down upon it at once. The same author mentions a huge and ancient Yew tree that grew upon the Island

of Bernera, adjacent to the Sound of Mull, and which was cut down by the late Sir Duncan Campbell. "Its precise dimensions," he adds, "were not preserved, but the timber of it deeply loaded a Highland six-oared boat, and was sufficient to form a large elegant staircase in the house of Lochnell, which was afterwards burnt."

At Loudon Castle in Ayrshire is a famous Yew, forty-two feet high and upwards of fourteen feet in circumference at twelve feet from the ground. Under this tree the Bruce is said to have bestowed the ancient castle and estate on the Loudon family. The Dryburgh Yew, supposed to have been planted at the time the abbey was founded in 1136, is still a fine flourishing tree, and its branches cover a space whose diameter is fifty feet. The girth of its trunk is twelve feet. It is a female, and produces abundance of berries, from which we have raised several plants. Sir T. D. Lauder mentions the Ormiston Yew, growing in the garden at Ormiston Hall, a seat of the Earl of Haddington, in Haddingtonshire, as one of the most beautiful Yew trees in Scotland. Its head covers an area of fifty-eight feet in diameter, and its greatest girth at five feet above the ground is nearly eighteen feet. In Ireland, the Mucruss Abbey Yew is supposed to be coeval with the building, which existed, and was celebrated as a sanctuary in 1180. Hayes, also, in 1794, records several Yew trees of considerable dimensions and great age, as existing at that time in Ireland.

Besides the Yews already mentioned, there are many others, in various parts of the kingdom, scarcely their inferiors, either in point of antiquity or dimensions, but which the limits of our work oblige us to omit; there are, also, numerous examples, of a younger age, in a

growing and flourishing state, which bid fair, in process of time, to rival the giants of their race. Among these we shall only mention a Yew in the grounds of J. M. F. Doveston, at Westfalton, near Shrewsbury, which, from its rapid growth and pendulous habit, promises to be a variety well-deserving of extended cultivation; added to which it has the uncommon property of being monœcious, one of its branches producing exuberant crops of berries, while all the rest are covered with male flowers. This tree, scarcely seventy years old, at five feet from the ground, is already upwards of five feet in girth. At Twizell, about eighteen years planted, it is seventeen feet high, diameter of the trunk seven inches.

In selecting Yew plants, particularly where timber is the object in view, attention should be given to the habit and mode of growth of the young individuals, and those should be preferred which show a strong and upright tendency, with broad healthy-looking leaves; for we find from experience that out of a bed of seedlings there are generally several which, instead of advancing upwards, or throwing their main growth into the leading stem, seem to expend their strength upon the elongation of the lateral branches; at Twizell, a Yew of this description, planted upon the lawn, though only ten feet high, covers with its side branches an area of a diameter of twenty-four feet. The Yew, with the exception of its varieties, is best propagated from seeds, and, as the berries are produced in great abundance by the female plants, there is seldom any difficulty in procuring an adequate supply, provided the trees are protected from the depredations of the thrush tribe during the period of the colouring or ripening of the fruit. After being gathered, they may either be sown immediately in their pulp, or be kept in sand during the

winter to rot off the enveloping matter, and sown in spring; in each of these cases the plant makes its appearance the second year, whereas if the pulp is allowed to dry round the nuts, and these are kept in that state till the following spring, none of them will vegetate till the third year. After remaining in the seed bed a couple of years they should be run into rows, and undergo the usual routine of the nursery till they are two or three feet high, or even much larger, as no tree transplants with greater certainty of success than the Yew, from the mass of succulent roots it emits and the ease with which a considerable portion of the adhering earth may be moved with it. For Yew hedges Boucher recommends plants of seven or eight years' growth, at which age, if they have been properly attended to, they ought to be from seven to eight feet high. Transplanting may safely be performed during eight or nine months in the year, commencing in autumn and continuing during the winter and spring, until renewed vegetation becomes evident in the swelling and bursting of the terminal buds; precaution, however, ought to be taken, in case of long-continued droughts in spring, to refresh the plants by copious and frequent waterings, and in winter newly-inserted plants should be protected from very severe frosts and biting winds, by branches or any other slight covering. The Yew may also be raised from cuttings, which strike pretty readily, particularly when slipped with a heel and run into soil chiefly consisting of sand and shaded from the sun; in this way, the upright, or Irish Yew, and other varieties are propagated. The cuttings should be made of shoots of one or two years' growth, and they are generally two years in becoming sufficiently rooted to be removed and treated as seedling plants. Amongst

the varieties the *Taxus b. fastigiata*, Lindl., Irish or Upright Yew, is well deserving of extensive propagation as an ornamental evergreen, distinctly marked from the common species by its cypress-like form, which tree it may be supposed to represent in our colder climate, and by the disposition of its leaves, which, instead of being in two ranks, like the species, are scattered around the stem. This variety was first discovered in the neighbourhood of Florence Court, Fermanagh, and the original tree, we believe, still exists in a healthy state. It has been extensively propagated in Ireland, and, when last in the north of that island, we saw fine specimens in the neighbourhood of Belfast and Antrim, near which place is the large specimen from which figure 1982 in the "Arboretum Britannicum" was taken. In Scotland there are several fine examples of this variety; Loudon mentions two trees at Nether-place in Ayrshire, and another at Balcarras, in Ayrshire, which is above fifteen feet high. At Jardine Hall, Dumfriesshire, there is a fine plant in the garden, about fifteen feet high; this has frequently produced berries, (the original tree from which they have all been propagated being a female,) from which plants have been raised, but, Sir William Jardine informs me, that none have yet shown the fastigiate growth of the parent; Loudon, however, mentions a seedling from this variety, in the Horticultural Gardens, Chiswick, which shows the upright growth of the Irish Yew, but has the leaves disposed as in the common species. The Yellow-fruited Yew, *Tax. b. fructu-luteo* is another variety, also first discovered in Ireland; except in the colour of its berries, it resembles the common Yew. A third variety is the *Tax. b. foliis variegata*, Variegated Yew, the leaves being striped with whitish yellow; this is an unhealthy-

looking plant, seldom found higher than a large shrub, and not worthy of a place in the shrubbery.

The Yew is subject to few accidents from the elements, the tough nature of the wood of the branches resisting the severest storms of wind, and, when loaded with snow, yielding, without breaking, to the weight, or without being torn from their sockets, as is so frequently the case with many other trees and evergreens. The wood, as well as the foliage, is remarkably free from the attacks of insects, as we know of no lepidopterous, and few other larva which make it their food, and the only parasitic plant found in any quantity upon it appears to be the *Sphæria Taxi*.



Order. Coniferæ.

Section. Abietinæ. Richard.

Before we proceed to describe such individuals belonging to this division of the *Coniferæ* as are admissible within the limits of the present work, either as being indigenous to the kingdom, or introduced and naturalized for a period sufficient to prove the quality and utility of their timber, as well as their adaptation for extensive cultivation in a British climate, a few observations on the tribe in general may not be deemed out of place, considering the interest created by the peculiarities which distinguish it in so many striking particulars from the other orders of trees, and the great importance attached to the timber of so many of its members for its valuable qualities, by the inhabitants of various parts of the globe.

The section of the *Abietinæ* consists of that portion of the *Coniferæ* or cone-bearing trees, generally known by the designation of firs, all of which, with the exception of the genus *Larix*, have their leaves persistent for more than a year, or are what are called evergreens. As a group they are distinguished from trees of other orders, as well as from the *Cupressinæ*, another section belonging to their own, by the linear or needle-like shape, and the stiff coriaceous substance of their leaves,* composed

* In the larch they are of a less coriaceous nature, consequently decompose more rapidly when shed, and are more fertilising to the ground beneath.

like those of the monocotyledons of parallel fibres without any lateral nerves, by the verticillate growth of their frond-like branches, which clothe them from the base to the summit, giving them a regular pyramidal or cone-like form, which holds good in all the species for a certain period of their existence, and by some is retained during the whole of it, as we see exhibited in the modern genera, *Abies*, *Picea*, *Larix*, &c., while others, as most of the genus *Pinus*, and genus *Cedrus*, at an advanced age lose this peculiar character, in consequence of the gradual decay and falling off of the lower branches, and their summits becoming rounded or flattened by the lateral extension and increase of the upper branches. The stature of the species, generally speaking, is lofty, sometimes attaining a very extraordinary height, the trunk straight and erect, and in all those firs which retain the pyramidal form during life, beautifully tapered from the base to the summit. The branches of these, we may add, always continue small and slender, in proportion to the bulk of the trunk, and have aptly been compared to immense leaves, and are one of the circumstances which seem to assimilate and connect the firs with the palms. The increase, or annual growth of the *Abietinæ*, is chiefly, and in certain species, entirely effected by shoots which proceed from terminal buds; for axillary buds, and such as are found at the base of the leaves of other orders of trees, are comparatively very rare. In genus *Pinus* they are scarcely ever seen, in *Abies* and *Picea* a few are met with, in *Cedrus* they are rather more abundant, and in *Larix* more numerous than in any other.

The buds are protected in their embryo or dormant state by numerous scales, which are sometimes varnished with a resinous coat; these are thrown off when vege-

tation becomes active, and the shoots proceed towards their developement, a process which commences at the lower part of the tree, and proceeds regularly upwards, the leading shoot produced from the topmost bud, being the last to be developed.

The leaves, as already stated, are linear, acicular, and persistent,* in some species remaining for many years upon the tree; they vary also in their disposition, in some being single, and placed in horizontal rows along the branches, or what is termed pectinate, as seen in the silver fir *(Picea pectinata)*; in others, as the spruce fir *(Abies excelsa)*, they stand in different directions around the branch; in others, again, they are placed in bundles, enclosed in a common sheath, varying from two to six in number, and these different arrangements of the leaves, as might be expected, have been seized upon by botanists to facilitate the sectional and generic divisions of the group. In genus *Pinus* the leaves are in bundles, and much longer than in those genera in which they are single, such as *Abies*, *Picea*, &c. In *Cedrus* and *Larix*, however, though many of the leaves spring in a tufted manner from the lateral buds or diminutive branchlets, they are not, correctly speaking, in bundles like those of the true Pines, as they have no common enveloping sheath, but are placed singly, as a close examination of these buds, as well as the leaves of a leading or extended shoot of either tree, will clearly show. The longest-leaved species of genus *Pinus* are such as grow in the warmest temperature; thus, the leaves of the *Pinus Australis*, Michaux, are from a foot to a foot and a half in length, and again those of the *Pinus pinaster*, and some of its near allies, are

* In the southern Pines we have exceptions in genera *Cunninghamia* and *Dammara*; in the first they are lanceolate, in the second oblong.

from six to nine inches long, while those of *Pinus sylvestris* or Scotch Fir, which reaches a much higher latitude, and in mountainous countries grows in a more elevated zone, seldom exceed two inches and a half in length. In the genera *Abies*, *Picea*, &c., few have them longer than half an inch.

The *Abietinæ*, with the exception, perhaps, of genus *Araucaria*, are monœcious, but the male and female catkins differ greatly from each other in appearance. In those of the male, the flower consists of a number of stamens, accompanied by scales, but without any floral envelope; they are always much more numerous than those of the other sex, and the discharge of pollen when they burst is remarkably abundant. In the female the fruit forms a cone, varying in size in different species, in some being not more than half an inch long, in others upwards of a foot; the flowers consist of a stigma, enclosed in a simple calyx or perianth, and accompanied by an involucrum, composed, in most genera, of two scales, the exterior of which is large and thick, the interior, which springs from the base of the other, is thin, and protects two flowers, which afterwards appear as winged seeds. In some the exterior scales are thick, hard, and adhere close together, as seen in *Pinus pinaster*, *Pinus pinea*, &c. In genus *Abies*, again, they are loose, and of a soft leathery texture; from such the seeds are easily extracted, but those of a hard woody substance require to be forced open, or else subjected to a considerable heat, to cause the scales to expand and allow the seeds to fall out; this we see naturally effected in the cones of the common Pine, *Pinus sylvestris*, by the heat of the sun in the spring and early summer months. In some the cones arrive at maturity and shed their seed in six

or eight months, in others they remain two, three, or four years upon the trees, and upon *Pinus pungens* as long as ten or twenty years. In some they stand erect, in others they hang with the apex downwards from the branches. The kernel of the seeds is composed of a farinaceous substance, mixed, according to the species, with more or less of a terebinthinate matter; they are of a wholesome and nutritive quality, and the largest kinds, such as the nuts of *Pinus pinea* and those of the *Araucaria*, are freely eaten and highly esteemed in those countries which produce them. In most species the seeds are polycotyledonous, as we observe them in the seedlings of the *Pinus sylvestris*, in which they vary from five to nine; in the larch, *L. Europea*, they are from five to seven; in *Abies excelsa* from three to nine; and in *Cedrus Libani* from nine to eleven.

The wood of the *Abietinæ* differs from that of dicotyledonous trees in being chiefly composed of parallel fibres, a structure that gives it great elasticity; it is also light, but at the same time strong, and from its resinous nature is, generally speaking, durable, particularly so in the larch and cedar, which bear exposure to the vicissitudes of the weather with as little injury as the timber of the most enduring deciduous tree.

The wood of the *Abietinæ* is, therefore, in universal use throughout the civilized world for almost all the purposes of civil architecture; and as no other order furnishes timber of the same length, and at the same time so straight and so regularly tapered, it is from the forests of this tribe that the masts, yards, &c., of ships, are almost wholly procured. It is also from the *Abietinæ* that so many of our useful resinous products are obtained, such as the various turpentines, resin, colophony, &c. Tar

also is another important substance, obtained by charring the wood, during which process the tar flows from it in the form of a thick black fluid, which is collected in reservoirs or casks made to receive it.

The geographical distribution of this section of the *Coniferæ* is very extensive, but the great majority of the species are found in the temperate parts of the northern hemisphere; some species extend to high latitudes, reaching nearly to the icy regions of the arctic circle, or if growing in temperate and warmer districts, inhabiting the mountains, where they occupy a zone so elevated as to reduce the climate to the degree of temperature equivalent to that of a higher latitude. Even the few species which grow within the tropics are always found in localities rendered comparatively cool, either by their elevation, or their proximity to the sea. The social nature of the *Abietinæ* is shown by the vast forests which cover extensive tracts of country, to the exclusion of almost every other tree. These prevail throughout all the northern parts of Europe, consisting sometimes of the common Pine, *Pinus sylvestris*, which is also the indigenous fir of Scotland, where it still occupies extensive districts; at others, of the spruce, *Abies excelsa*. In parts of Germany the *Pinus Austriaca* is the prevalent species; in others, *Pinus pallasiana*. In the Swiss and the Tyrol Alps the larch abounds, as well as the *Picea pectinata*, perhaps the finest of the European firs. In North America, also, enormous tracts of country are wholly occupied by forests of *Abietinæ*, among which those of the *Pinus strobus*, Weymouth Pine, which furnishes the white deal of commerce, and is largely imported into Britain from our Canadian provinces, are, perhaps, the most extensive. In Asia, the great chain of the lofty Himalayas, and the moun-

tains of Nepaul, afford appropriate zones for the growth of forests of firs and cedars, and from these remote districts we are almost annually receiving the seeds of new and important species, many of which, there is reason to suppose, may be acclimated in this country, and become important additions to our list of *Coniferæ*.

The soil upon which most of the *Abietinæ* prevail, is usually of a dry and cool quality; thus, the *débris* of granitic and other primitive rocks, and barren sandy districts, are very commonly occupied by Pine and fir forests, sometimes of enormous extent; the thick and close manner in which they grow, and the dense shade they produce, effectually preventing the vegetation of other species. Matthew, however, in his able treatise on naval timber seems to think that its indigenous location in such districts arises not so much from preference of soils of the nature abovementioned, as from its having more power of occupancy in such soils than any other plant of the country; and this opinion he endeavours to support by stating that the *Pinus sylvestris*, planted in a good or rich soil, attains larger dimensions and its best timber properties, and that it is only driven from this superior soil by the greater power of occupancy possessed by the oak and other deciduous trees, an opinion in which we cannot altogether acquiesce, as we see no reason why the fir, if it grows with such additional vigour in a richer soil, as Mr. Matthew asserts, should, at the same time, be unable to maintain a contest with the oak or other trees.

Of late years, the cultivation of the *Abietinæ* has been a favourite pursuit with arboriculturists, and many new species have been introduced from the south-east of Europe, from Asia, and North America, particularly from the north-west part of that Continent. Several of these,

from their rapid growth, the excellent quality of their timber as tested in their native regions, and their apparent adaptation to our climate, promise hereafter to be highly advantageous and of great national importance, while others, though affording a timber of less value, are, nevertheless, deserving at least of limited culture for the beauty and symmetry of their form and the ornamental effect they produce. Pinetums, or collections of the *Abietinæ* planted by themselves, are now numerous throughout the kingdom, and have become an object of great interest to dendrologists. Among the first established and in which the trees have now arrived at a considerable size, is that at Dropmore, near Windsor, formed by the late Lord Granville in 1810. In Bedfordshire, at Flitwick House, the seat of T. Brooks, Esq., the Pinetum is rich in species. In Cornwall, at Carclew, that of Sir J. Lemon is also very extensive. In Northumberland, the first established and richest Pinetum is that of Sir C. L. M. Monck, Bart., at Belsay Castle, but others have since been formed, among which we may mention one at Howick Hall, the seat of Earl Grey, which we lately inspected, and where we found many of the rarer kinds growing very luxuriantly. In Scotland, also, several Pinetums have been formed, some of which are rich in species, and in others they grow with a luxuriance which shows the soil to be congenial and adapted to their habit.

Much, however, as we admire Pinetums, and glad as we are to see them encouraged and becoming more numerous throughout the kingdom, we are still more anxious that the culture of the *Abietinæ* should not be confined to the restricted limits of the portion of ground set apart for this particular purpose, but that further experiments should be generally made by large landed proprietors, to ascertain,

—by planting the different species introduced, in a variety of soils and situations and at different elevations, where they are likely to grow most vigorously and soonest to turn to profitable account,—facts which we can scarcely expect to determine from examples grown in Pinetums, where the soil and local situation can scarcely be supposed to be suitable to all the different species assembled within their bounds. Such a plan we are now pursuing upon a limited scale, and we strongly recommend its adoption by those who possess extensive estates, which afford a variety of surface and soils of various quality, more particularly directing their attention to those species which, in their own regions, evince a hardihood of constitution and yield a valuable timber, among which we may particularize the *Pinus uncinata* of Captain Widdrington, *P. Hispanica*, *P. Austriaca*, *P. Pallassiana*, *Abies Douglassii*, and *Cedrus deodara*, which, by some, is expected hereafter to rival the larch in national importance.

Independent of the value of the *Abietinæ* for the excellent timber they produce, most of the species, as ornamental objects alone, are well deserving of culture, no tribe of plants exhibiting greater individual beauty from their earliest age, either in point of symmetry or regularity of form, added to which they have the advantage of being evergreen, and in many cases attain a stature loftier than most of our deciduous trees. As ornamental objects, however, they require a treatment very different from that which they ought to receive when grown in mass with a view to timber or profit, as, instead of being planted near to each other or to other trees, and kept in pretty close contact for several years, in order to promote the early decay of the lower branches, whereby a clean trunk, devoid of knots, can alone be ensured, they should,

from the earliest age, have ample room on every side, nor should any other plant be suffered to interfere with the growth of the lower branches, as upon the retention of these, which are so essential to the perfect pyramidal form of the true firs, their beauty and elegance chiefly depend. The propagation of the *Abietinæ*, upon an extensive scale, can only be effected by seeds, which, however, are produced in abundance by most species after they attain a certain age, by a succession of cones which are a longer or a shorter time in arriving at maturity, in some kinds several years being required to ripen the seed contained, whilst in others this is effected in the course of a few months. Most of the species may also be increased by layers or by cuttings, a mode of propagation known in the time of Evelyn, who mentions it as a "considerable secret." Inarching on closely allied species has also been successfully practised; and, within the last thirty or forty years, what is called herbaceous grafting, —an operation we shall afterwards have occasion to speak of more in detail,—seems to be the most approved mode of artificially increasing species lately introduced and which have not yet reached a cone-bearing age. Upon the culture and management of the *Abietinæ* in general we conclude our remarks for the present, reserving further observation on these subjects till we enter upon the particular descriptions of the different species admitted within the limits of our work, and we shall also leave to the same opportunity our observations on the various diseases, accidents, &c. to which they are subject, as well as an enumeration of the insects by which they are infested or attacked.



Genus *Pinus*, LINN.

LINN. *Syst. Monœcia Monodelphia.*

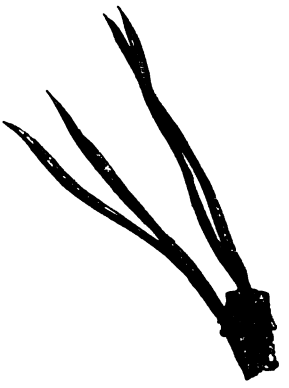
Pinus sylvestris.

THE PINE.

Pinus sylvestris,

LINN. sp. pl. 1418.
HUNT. Evel. Sylv. i. p. 274.
SMITH's Flor. Brit. t. 1031. Id. Eng. Flor. iv. p. 159.
HOOKER's Flor. Scot. 275.
LAMB. Pin. ed. fol. i. t. 1.
MACKAY's Flor. Hibern. p. 258.

The specific characters of this species, as given by Sir J. E. Smith, are, leaves rigid, in pairs, the young cones stalked and recurved, crest of the anthers very small. As additional characteristics, we may remark that the leaves are from one inch and a half to upwards of two inches long, slightly waved or twisted, the upper surface concave, the under convex, of a glaucous green-colour. The sheath which incloses them at the base is winged and uneven on the edge. The terminal buds, which are found at the ends of each year's shoots, and consist of a central and from four to six smaller side buds around it, are oval and blunt-pointed, clothed with reddish chaffy scales, which are more or less varnished at the base with a white resinous exudation, and, in the winter or during the dormant season, are from a quarter to half an inch long. The male flowers or catkins, when in bloom, are from half an inch to upwards of an inch long, and are placed in whorls at the base of the young shoots of the current year; the flowers contain two or more stamens with large yellow anthers, which discharge a sulphur-coloured pollen in great





abundance. The embryo cones or female flowers appear on the summits of the shoots of the year, in number



from two to as many as six, and of a green or purplish green colour. When impregnated, they become lateral and reflexed, and cease to increase in size till the following spring, when they again begin to swell, and by July attain their full size, ripening by degrees into ovate, pointed, and tesselated, hard woody cones, from one inch and a half to two inches long. These remain on the tree for a considerable time afterwards, though the seeds are discharged the following spring, and it is then that trees are frequently seen with cones in four different stages: viz., in the youngest or embryo state; in an unripe or green condition, but of full size; in a matured state, or when they have become brown; and lastly with the scales expanded after the seed has been shed. The scales of the cones are oblong and terminate externally in a kind of depressed pyramid, which varies considerably in shape and height; in some this part of the scale is considerably raised and pointed, in others the summit of the pyramid is bent to one side, or turns downwards in the shape of





a blunt hook or prickle, and again, in others, it is almost smooth or with the summit depressed and sunk. At the base of each scale and close to the axis of the cone two seeds or nuts are lodged, each with a large membranaceous wing, which encircles, but is not directly attached to, them. From these nuts the young plant appears in the shape of a slender stem, with from five to six linear leaves or cotyledons.

In trees which have had sufficient space from an early age the trunk is generally furnished with branches from within a short distance of the ground; but in forests, or when grown in thick masses, the lower branches decay and fall off, in consequence of the want of room and air, and a clean naked trunk, of great length, is the result. The branches, as may be supposed from the disposition of the buds, are in whorls; when young they turn slightly

upwards, but, as they elongate, they take a horizontal direction, and in old trees finally become somewhat pendent. The bark is of a fine reddish brown, in some varieties deeply furrowed, in others nearly smooth and scaling off in patches. In favourable situations the Wild Pine often attains a height of eighty or one hundred feet, with a trunk from two to four feet in diameter.

In whatever light we view the Common Pine, whether in relation to its distribution over so large a surface of the globe, its value as a timber in most extensive use in civil as well as in naval architecture, or to its individual form and aspect as a vegetable production, we may safely affirm it to be one of the most important and interesting of the *Abietinæ*. Its geographical distribution is very extensive, being found in Europe from the Mediterranean on the south to latitudes as high as 70° on the north, and from Spain and Britain on the west, to Siberia in the east. It also occupies regions in the north, the east, and west of Asia, but has not been found in America, unless the species growing at Nootka Sound should prove a stunted variety. In Britain it is the only indigenous species of the fir tribe, and at some distant period, from the remains of large trees, cones, &c., found in peat mosses, appears to have occupied most of the elevated tracts of the kingdom, though the natural forests now remaining are greatly reduced and confined to the mountainous districts of Scotland. In Ireland, also, where extensive forests once prevailed, they no longer exist. In Scotland it grows at a height varying from one thousand four hundred to as much as two thousand seven hundred feet, but at this latter altitude it dwindles almost to a bush; in the more southern parts of Europe the zone it occupies extends to a greater elevation, being in some countries upwards

of four thousand feet, while in the colder regions of Norway, Lapland, &c., under 70°, it only reaches to seven hundred feet above the level of the sea. Widely dispersed, however, as the species is found throughout all the mountainous regions of Europe within the limits of its appropriate zone, it is between latitudes 52° and 65° that it is met with in the greatest profusion and becomes the prevailing tree. Thus upon the extensive plains of Poland and Russia it occurs in forests of immense extent, as well as in Northern Germany, Sweden, Norway, and Lapland, up to the 70° of north latitude, in all which countries a large proportion of the surface is almost entirely occupied by its dense masses, and from which almost inexhaustible resources Britain, as well as other countries draw their principal supply of the finest Red Pine timber. The indigenous forests of Scotland, which formerly occupied so large an extent of its territory, have, within the last sixty years, been greatly reduced, in consequence of the demand for Pine timber, occasioned by the difficulty of obtaining wood from the Baltic during the late wars; some, indeed, are nearly obliterated, as that of Rannoch, which once occupied an extensive area, but whose site in many parts is only now to be traced by the decaying roots which rise above the ground, or by the occasional appearance of small detached groups or single trees, which escaped the destroying axe, either from their trifling value or the peculiar and perhaps inaccessible situations in which they grew. Such, also, has been the fate of the forest of Glenmore, once famous for the size and age of its timber, whose magnificent pines clothed one of those romantic glens or passes intervening between the mountain mass of Cairngorum and the river Spey, and which once formed a continuation of that of Rothiemurchus. This noble

forest was purchased of the Duke of Gordon in the year 1783, by William Osborne, Esq., a merchant of Hull, for the sum, according to Sir T. D. Lauder, of 10,000*l*. Out of its produce no less than forty-one sail of ships were built at the mouth of the Spey, of upwards of nineteen thousand tons burthen, and amongst them a frigate called the Glenmore, of one thousand and fifty tons. The cost alone in labour of converting the produce of this forest, is stated by the purchaser to have amounted to seventy thousand pounds. Of the size attained by some of these trees an idea may be formed from the inspection of a plank deposited in the entrance hall of Gordon Castle, presented to the late Duke of Gordon by the purchaser of the forest as a specimen of the growth of one of its trees; it is six feet two inches long, and five feet five inches broad, with the texture of the finest Red-wood Pine, and showing annual growths to the number of two hundred and thirty-five. Some eighteen years ago, when we passed through Glenmore on a walking excursion from the banks of the Dee to those of the Spey, the tract previously occupied by this once magnificent forest exhibited a scene of savage wildness and desolation. Scattered trees, some of which were in a scathed or dying state, of huge dimensions, picturesque in appearance from their knotty trunks, tortuous branches, and wide-spreading heads were seen in different directions, at unequal and frequently at considerable distances from each other; the solitary and mournful-looking relicts of the departed glories of this once well-clad woodland scene, and which had only escaped the axe from their previous decay, or the comparative worthlessness of their knotty trunks, while the surface of the ground in almost every direction was littered and bristling with the decaying tops and loppings of the felled trees, among

which mosses of various species were growing with a luxuriance we scarcely ever saw equalled, nourished, it would appear, and encouraged by the partial stoppage and stagnation of the surface water thus impeded in its course,—this rapid accumulation of these cryptogamic plants threatened, at the time we mention, to convert a large proportion of the surface that had once been forest, into a peat moss; but we gather from Sir T. D. Lauder, who has subsequently visited it, that the forest of Glenmore is fast replenishing itself, the seedling firs starting in countless thousands from its surface, and promising, from their rapid growth, again to restore to this wild mountain glen the gloomy character of its pristine forest scenery. A little to the west of Glenmore, and nearer to the Spey, upon an irregular surface, varied and interspersed with numerous highland lochs, stands the forest of Rothiemurchus, which, at one period, covered with its dense masses a surface of sixteen square miles. The axe, however, for many years past, has been busily at work, the profits to the proprietor, from the fall of pine timber, according to Sir T. D. Lauder, having sometimes amounted to 20,000*l.* in one year.

In consequence of the rapid and wholesale destruction of this once extensive forest, it is now nearly denuded of its old and finest timber, and scarcely exhibits a remnant of its ancient growth. Its renovation, however, is rapidly going on, as a thriving crop of seedlings spring naturally up after every fall of timber, which, if protected from the inroads of cattle and sheep, thrive vigorously, and in time will no doubt emulate the dimensions of their progenitors.

The timber of this forest, from the close thick manner in which the trees originally grew, was clean, straight,

and of excellent quality, though not of equal diameter to the pines of Glenmore: Mr. Grigor, in his report,* states that he found the trees averaging, at six feet from the ground, about four feet six inches in girth, the bole diminishing but little for upwards of thirty-five feet in length. The average height of the trees was about seventy feet, and their age from one hundred and twenty to one hundred and twenty-five years.

The soil of this forest, except the hollows, which are peaty and moist, he describes as dry and sandy; the substratum being a hard granitic gravelly loam. Lower down upon the south side of the Spey, near the southern extremity of Morayshire, is the ancient forest of Abernethy, the property of the Earl of Seafield. It stands upon a tract diversified by hill and dale, the soil of which consists for the most part of a thin sandy peat, with a subsoil of hard, yellowish-brown, granitic, gravelly earth.

The timber of this forest is esteemed for its superior quality, being very resinous, and consisting almost wholly of matured red wood. The Duthal Pine forests, the property of the same nobleman, to the west of Abernethy and on the north bank of the Spey, occupy a mountainous surface; the finest timber, as might be expected, growing upon the sloping bases of the hills and lowest grounds. In this forest, the prevailing soil of which is a thin sandy peat, upon a rich subsoil of brown granitic mould, the timber is also of excellent quality. Many of the trees examined by Mr. Grigor, girted from six to twelve feet at one foot from the ground, and exhibited from one hundred and twelve to one hundred and twenty-five annual rings; the sap wood upon each tree did not average more than one inch and a half in thickness.

* See his report in "Trans. of Highland Soc."

Upon the Dee, the forests of Braemar and Invercauld are of very large extent, and produce Pines of as great a size as any that are to be met with in Scotland. During our excursions to that interesting portion of the highlands we have frequently admired the beautiful forms and huge proportions of some of those near to Mar Lodge and the falls of the Dee, particularly where the trees had stood sufficiently apart to allow the retention of a portion of their side branches, and the full and unrestrained expansion of their heads, objects indeed well worthy of the pencil of the artist or the commendation of a Gilpin or a Lauder. But, alas! since we last visited that interesting district, we have learnt with regret that the axe has been let loose within the precincts of the forest of Mar, and that already much of its finest timber has fallen beneath its fatal stroke.

Such are the principal remnants of those ancient Caledonian forests, which, to judge from the constant occurrence of Pine trees, found buried beneath the peat mosses wherever they have been dug into, as well as from other remains, and old decayed roots upon many extensive wastes, would seem, at some earlier period, to have spread over a much larger portion of its surface than they now occupy. To their present limits they have been reduced, not more effectually, we believe, by the axe, than by the great increase of herds and flocks, which, once admitted in any considerable numbers within the precincts of forest land, soon put an effectual stop to the renovation of its timber, by constantly browsing upon and destroying the seedling plants as they spring from the ground.

In all these native forests we find the soil is generally of a dry sandy or gravelly nature, composed of the *débris* of the older or granitic rocks; this, indeed, appears to be the soil most congenial to the nature of the common

Pine, not only in Scotland, but in the other countries where it is the prevailing species; at the same time, we may remark that it will grow, and sometimes luxuriantly, upon ground of a different description, and whose component parts are derived from rocks belonging to a more recent series, provided the subsoil be dry beneath. In these granitic soils the substratum is frequently of considerable thickness, and of a yellowish or brown colour, being a mixture of abraded rock and earthy matter, and it is always where this soil proves of the richest quality that the finest and largest Pines are found to grow; thus, Mr. Grigor observes, "the soil of the highland forests is found of different qualities, which in some manner regulates the quality of the timber. The richest ground produces the largest trees, consequently, the timber is not so fine in the grain as that grown on sand or poor gravel; but the quick-grown trees appear as full of resin, as healthy, stand to as great an age, and are as red when cut up as those which grow on poorer soil. In general," he adds, "the soil of the native highland forests is superior to that in which firs are commonly planted throughout the low country."

In addition to the native forests, artificial Pine plantations of great extent exist in Scotland; these began to be formed about the commencement of the eighteenth century, and were composed exclusively of this tree till the introduction of the larch as a forest-tree, about the middle of the last century, in a great measure suspended its use, as it was found that besides producing a more valuable timber at every stage of growth, the latter tree grew faster, was equally hardy in its constitution, and did not require a soil of a different or better quality than what was necessary to bring the Pine to perfection. In consequence of this superiority over the fir, the larch

has been largely introduced in all those extensive plantations that have been made within the last fifty or sixty years in Scotland, and particularly in the highland districts; some proprietors mixing the species in equal numbers, others in the proportion of two larches to one Pine. In England, also, at one period, the Pine was mostly planted in masses by itself, and as the nature and quality of the proper Pine soil does not appear to have been understood or taken into consideration, these plantations were usually limited to the poorest and most impoverished soils of every description, under the supposition, we presume, that because this tree flourishes amidst the wild heathy districts of the Scottish highlands, it must therefore succeed upon barren tracts of every description. As might be expected, the progress of many of these plantations, made upon soils unfitted to bring the tree to perfection, or any tolerable scantling, was seldom such as to answer the expectations of the planter, and this, together with the improper uses to which the unmatured timber at an early age, and when consisting entirely of sap wood, was applied, brought the Scotch fir into great disrepute in England; such, indeed, was the prejudice created against it towards the close of the last century, that by some proprietors an indiscriminate destruction of the Pine was commenced, and some writers advised its utter exclusion from every soil and situation in which any other tree could be made to grow. This prejudice, we believe, still exists to a very considerable extent, and though the Scotch fir continues to be admitted into most mixed plantations in a certain proportion, it is much more frequently as a nurse and protector to the oak and other species, than for the timber it produces.

The Common Pine is naturally slow in undergoing that change which converts the white or sap wood, into red

or matured timber, a change, we believe, that rarely commences, at least in lower and richer grounds, before it has attained thirty or forty years' growth.

The red wood timber of the Scottish forests, similar, in every respect, to the best Baltic Pine, is the produce of trees that have numbered from one to two or more centuries; thus, the trees in the forest of Rothiemurchus were found by Mr. Grigor to average from one hundred and twenty to one hundred and twenty-five years, some in that of Abernethy from two hundred to two hundred and forty-two years. In Norway it is not considered full grown timber till it has reached from one hundred and thirty to two hundred years; and in Silesia, we are informed by a resident proprietor, that the forests are each divided into one hundred equal divisions, one of which is cut over every year, by which arrangement an annual fall of timber is secured of one hundred years' growth, under which age it is not considered as having reached maturity or to be fit for the market. It seems, then, rather preposterous, that any one should expect that plantation fir-timber, cut down when, perhaps, not more than thirty years old, and consisting entirely of sap wood, should, without any preparation, be adapted to all those purposes which require the best full-grown and matured timber, and yet such seems very generally to have been the case, and to the disappointment at not finding those expectations realized may be attributed a large portion of that prejudice and dislike so generally entertained towards this tree. Inferior, however, as the sap wood may be in many respects, when compared with Pine timber in its red or matured state, we deny that it is of so worthless a nature as many have described it; if properly prepared and treated, that is, sawn up immediately upon being cut and carefully dried, it is not

only durable, but is tougher and less liable to split than the matured timber. In this opinion we are supported by the authority of Mr. Matthew, who says, "Boards of sap wood, or fast-grown Scots fir, particularly of the outside layers, are much better suited, stronger, and more lasting for boxes used as carriage packages, or for machinery, or cart lining much exposed to blows and friction, than boards of the best matured red wood of Memel, Swedish, or Norway Pine. To have these sap-wood boards in perfection," he adds, "the tree must not be left in the bark after felling, and the boards must be well dried soon after being cut."

It has also been used for roofing, and other building purposes with success, and found durable after having undergone the process of steeping in lime water; this mode of protecting the fibre of Scotch fir sap-wood, was first practised by Sir J. Menteath, Bart., of Closeburn, Dumfriesshire, some fifty years ago, and he finds, that sap-wood which unprotected would not have lasted thirty years, after having been subjected to this treatment, shows not the slightest symptoms of decay, after having been put up for more than forty years. The solution is made by dissolving a small quantity of quick lime in the water in which the wood is steeped, and in which it ought to remain for ten days or a fortnight. Kyanizing, or the solution of corrosive sublimate, would, doubtless, be equally if not more effective than the lime, but more costly in its application.

By many it has been affirmed that plantation Pine wood never acquires the properties and excellence of forest-grown timber. To this opinion, however, we are not inclined to yield an unqualified assent, for, we believe, provided that fir plantations be made upon soil

really congenial and adapted to the habit and nature of the tree, and where plants of a good variety and from seed of the true native Pine are selected, that, under such circumstances, the timber, if allowed to attain maturity, that is one hundred years' growth or upwards, would be little, if at all, inferior to that grown in the highland or foreign native forests. Upon soils unsuited to its habit, but such as are very frequently selected for the sites of plantations, we admit that it never can arrive at such perfection, inasmuch as the conditions are then wanting to effect the maturation or proper conversion of the fibre into heart-wood.

In Scotland many examples of plantation fir, when allowed to obtain a proper age, have been found to produce timber in every respect similar and equal to the native tree, and even, in some parts of England, the common Pine, when aged and matured, has been pronounced, by a planter and manager of timber of high and deserved repute,* to be equal, in point of strength and durability, to any foreign deal whatever.

The wood of the Pine, in its matured state, varies in colour from a yellowish to a brownish red, and it is observed that logs of the deepest tint are harder, firmer, and more durable than those of a paler colour, the former possessing more of the inspissated resinous deposit than the latter. Slowness of growth is considered to be one of the requisites necessary to produce the best Pine timber, but, though this may be affirmed as generally correct, where hardness, density, and strength are looked to, it has its exceptions, and logs of slow or small growth are not unfrequently met with inferior in strength and

* Mr. Thomas Davis. See a paper by this gentleman in the "Transactions of the Society of Arts," vol. xvi.

more tender than those whose growth has been quicker, as indicated by the width of the annual layers or circular deposits of wood. Much, also, depends on soil and climate, and not a little, we believe, upon the habit or constitution of the individual or the variety to which it belongs, for there are some forms of the common Pine, that, even under the most favourable circumstances, produce a white soft wood, destitute of the resinous deposit, and without either strength or durability. On the contrary, where the variety is naturally good, timber of excellent quality is often produced, where the other circumstances considered necessary to its perfection seem to be wanting; thus, Lawson in his Manual mentions a plantation of Scots fir that grew near the side of the Perth and Dundee road, and which was originally stocked with plants raised from seed obtained from the forest of Mar, already mentioned as remarkable for the size and beauty of its trees. After standing about eighty years the plantation was cut down, and the timber, he remarks, "although grown on a poor, damp, and tenacious clay, besides attaining a great size, was found equal in quality to that for which the above-mentioned natural forest is esteemed." Mr. Matthew, also, when speaking of the timber of the Scotch fir, says, "by far the best timber in quality, of its age, of any we know, stands upon a very adhesive coarse clay." These exceptions, however, we do not bring forward as indicative of any preference shown by the Pine to such soil, but to prove that when the variety or kind is naturally good, it will, at least for one generation, mature its timber, even when grown upon soil very different in quality to that it naturally affects or upon which it is found native.

The durability of Pine timber, when fully matured,

indicated by the redness of its colour, is considered to be scarcely inferior to that of the oak, and instances are given where timbers of Pine in the roofs of old buildings had, after the lapse of several centuries, been found perfectly sound; amongst these is one mentioned by Dr. Smith in the "Transactions of the Highland Society," where the timbers of an old castle, after they had sustained the roof for three hundred years, when taken down were found as fresh and full of resin as newly imported timber from Memel. In addition to durability the wood of the Pine is light, stiff, and strong, easily worked, and freer from knots than most other species of fir, qualities which render it admirably adapted for all kinds of house carpentry and joinery; its length and straightness of trunk, as well as the large scantling it attains, fits it also for the main timbers of buildings, such as rafters, joists, &c., which are almost universally made of it. In naval architecture, again, it is very extensively used, and the best masts and spars are considered to be those of the common Pine, imported from Riga and other parts of the Baltic. Entire ships are also frequently built of it, but these are better calculated for trade than for vessels of war, as they are not only weaker and less durable than those built of oak, but they have the disadvantage of splintering to a much greater extent when struck by cannon shot, which is always attended with greater danger and destruction of life, than when the missile merely opens itself a passage through the wood. In a young state, as we have already remarked, the wood of the Scotch fir is very inferior to the same when matured, and, in order to render it useful and available, it must be subjected to some artificial process. It is, however, far from being an unprofitable wood to the planter in many districts, even in this inferior state,

as the thinnings, by the time they are twenty years old, are of size sufficient to cut into staves for making the barrels in which the smoked or red herrings and other dried fish are packed. Throughout the whole of the coasts of Scotland and the North of England, they also afford the chief supply of pit props, consumed in enormous quantities by the collieries of the Tyne and the Wear, and are now beginning to be employed in forming the wooden pavement lately introduced into the streets of the metropolis. For most of the above uses, a crop of Scotch fir may be obtained from soils too poor to bring even the larch to a marketable size.

In Britain the resinous products of the Pine are seldom turned to any account, but upon the Continent, in Sweden, Norway, Russia, &c., the greater proportion of the tar of commerce is procured by a kind of dry distillation of the Pine, the wood being subjected to a slow combustion as in making charcoal, when the tar, which exudes from it in the form of a thick, blackish brown liquid, is conducted into vessels or barrels so placed as to receive it. The tar, when it is wished to convert it into pitch, is boiled slowly and for some time in large copper vessels, after which it is let out, and as it cools hardens into that substance. Turpentine, also, but of an inferior quality to that procured from the silver fir, is obtained by stripping off a piece of bark from the trunk of the tree in spring, when the sap is in motion, and the resinous juice that exudes is received in a notch or hollow cut in the tree, at the bottom of the canal formed by removing the strip of bark; this juice, as it accumulates, is ladled out into a basket, and the liquid that passes through the interstices is the common turpentine. The residue, or thicker matter that remains behind, is then put into a common alembic

with a large quantity of water, and, on distillation, the essential oil or spirits of turpentine comes over, leaving a residuum of the common yellow resin of the shops at the bottom of the still. There are, also, a variety of other uses to which the Pine, or parts belonging to it, are applied; thus, in Russia and Lapland, the outer bark, like that of the birch, is frequently used by the natives for covering their huts, or, as a substitute for cork, to float the nets of the fishermen. Strong and elastic ropes are also made of the inner bark, which is also sometimes woven into mats like those made from the lime tree. In Norway, we learn from Mr. Laing* that, in years of scarcity, which not unfrequently occur in that country, in consequence of early autumnal frosts, which prevent the ripening of the cerealia, the inner bark of the common Pine is actually used by the inhabitants, and that to a considerable extent, as an ingredient in their bread. For this purpose it is very highly kiln-dried, and then ground with a portion of high dried oats into a very fine meal, and the bread baked of this mixture is said to be by no means unpalatable or unwholesome. The mode of preparing it is "in flat cakes, covering the bottom of the girdle or frying pan, and as thin as a sheet of paper, being put into the girdle in nearly a fluid state."

In Russia, many of the roads are formed of the trunks of the Scotch Pine, trees from six inches to a foot in diameter at the larger end being selected for the purpose; these are laid down side by side across the intended road, the thick end of the one alternately with the narrow end of the other, and the branches being left at the end to form a sort of hedge on each side of the road; when thus laid, the hollows between the trunks are filled up

* See Laing's "Journal of a Residence in Norway."

with earth, and the road is finished; this kind of highway is precisely analogous to what are termed Corduroy roads in North America, and we believe are usually as uncomfortable and jolting to the traveller.

As fuel, the wood of the Pine, though it gives out much heat and is easily fired, burns very rapidly, accompanied by a black disagreeable smoke, on which account it is inferior to many other woods as a chamber fuel. The charcoal it produces is excellent, and is made in large quantities where tar is manufactured. Of the roots torches are made, and, when split into thin pieces, are frequently used in the highlands as a substitute for candles, and of this material they commonly make the lights used by the fishermen in our northern rivers, when engaged in the exciting nocturnal amusement of Leistering, that is, spearing the salmon.

Before we proceed to speak of the mode of propagation and the management of the Pine, a few observations upon its ornamental properties and the effect it is calculated to produce in landscape scenery may not be deemed out of place. If our observations were to be confined or limited to the appearance of the Pine as seen in close plantations consisting entirely of the species, or even to the internal or thick part of the natural forest, where the trees are drawn up to straight naked poles, devoid of side branches, surmounted by a mere tuft of sombre green, and exhibiting a gloomy sameness of character, or to those miserable-looking belts of fir so frequently seen in England and the lowlands of Scotlands as boundaries to property, or lining the sides of our public roads, admitting through their starved and naked stems the whistling wind and driving shower, we might possibly concur in opinion with those who, without restriction, lavish unbounded abuse upon the

Pine; but, as we consider that the tree, under these circumstances, is seen under a false and unnatural character, we turn to view it in those instances where it has been judiciously planted upon a soil capable of bringing it to full size and maturity, and where ample space has been given to allow it "to form its head amongst the thick branches," or else to those noble specimens and picturesque groups, which we have so often admired when growing in its native highland wilds, and which have been introduced with such effect into the beautiful productions of some of our most gifted artists; under these more favourable circumstances, and in what we deem its natural state, we pronounce it, without hesitation, to be one of the most picturesque, and also amongst the most magnificent of our forest trees. In this opinion we are supported not only by the authority of Gilpin, who speaks of the Pine, when thus permitted to assume its natural form and spread its ample head aloft, uncontrolled by the close approach or interference of other trees, in terms of high approval, but also by the commentary of his accomplished editor, Sir T. D. Lauder, who, with the feelings of one who truly appreciates the romantic scenery of his native land, exclaims, "We, for our parts, confess, that when we have seen it towering in full majesty in the midst of some appropriate highland scene, and sending its limbs abroad with all the unconstrained freedom of a hardy mountaineer, as if it claimed dominion over the savage regions round it, we have looked upon it as a very sublime object. People who have not seen it in its native climate and soil, and who judge of it from the wretched abortions which are swaddled and suffocated in English plantations, amongst deep, heavy, and eternally wet clays, may well call it a wretched tree; but, when it stands

freely on its native knoll of dry gravel, or thinly covered rock, over which its roots wander afar in the wildest reticulation, whilst its tall, furrowed, and often gracefully sweeping red and grey trunk, of enormous circumference, rears aloft its high umbrageous canopy, then would the greatest sceptic on this point be compelled to prostrate his mind before it, with a veneration which perhaps was never before excited in him by any other tree."

In planting the Pine for its ornamental and picturesque effect, whether singly or in groups, soil, as well as situation, must be particularly attended to; the one to ensure its reaching its full dimensions, the other, that when grown up it may produce the greatest effect, either by contrast with other surrounding trees, or by the beauty of its own form and the appropriate station in which it is placed. In respect of soil great richness is not required, but it is essential that the substratum be dry, and as to the sites selected, these must be regulated by rules of taste and the peculiar features and locality of the place. One essential point must be observed, viz., that the plants be of the best variety, and immediately derived from seed of the native highland Pine.

As this tree is propagated entirely by seeds, the greatest care ought to be taken by the nurserymen, in justice to the planter who purchases his trees, to see that the seed from which he raises his stock be gathered from a good variety, and if possible from trees of the native highland forests. In case a sufficient supply of seed of this description cannot be procured, then, as the next in goodness, such as is produced by plantations that have been made upon a granitic or proper Pine soil, and the trees composing which are themselves the offspring of forest seed. Inattention to so important a consideration as the

selection of proper seed, has, we believe, mainly contributed to the introduction of that spurious kind or bad variety of Pine which has been so generally complained of, and which has tended to bring additional odium and disrepute upon the tree; for a large proportion of the plants that have been raised in the lowlands of Scotland and in England, are from seed gathered from an inferior variety, deteriorated still more by being planted in an ungenial soil and climate, as it is well known that such trees are in the habit of producing a more abundant crop of cones than the free-growing healthy variety of the forest. The necessity of procuring seed or plants immediately from the native tree is, we think, evidently shown, from what is now taking place in regard to the Common Pine in some parts of England, and more particularly in Norfolk. When first introduced into that country, it is supposed that the trees, or at least the seed from which they were raised, was procured from Scotland; these trees, in consequence, we believe, of their immediate descent from the wild original, in many instances have attained large dimensions and become fine timber; but such seems to be the effect of soil and climate different to the one in which the Pine grows naturally, that the plants raised from the seed of these Norfolk trees are so deteriorated in constitution, that few of them when planted live for more than twenty-five years.

The cones of the Pine should be gathered in December or January, as the scales soon after the latter month begin to open and shed the seed in consequence of the increasing heat and influence of the sun. When gathered and laid by in a dry cool place they will, if required, keep good for a couple of years, but if the seed be wanted forthwith they ought to be exposed to the rays of the sun till the

scales expand and the seed falls out. This by many is effected in a much quicker way by subjecting the cones to the process of kiln-drying, a mode, however, which unless conducted with the greatest care, we consider, in common with Boutcher and Matthew, as likely to prove highly injurious to the constitution of the future plants.

The time for sowing is from the end of March to the beginning of May, according to the nature of the season. A light free soil is selected for the seed-beds, and the seed, which is sown very thick or so that the plants rise within a quarter or half an inch of each other, is covered with a sifting of fine soil to the depth of about a quarter of an inch. The young plants are generally allowed to stand two seasons in the seed-bed, and are then transplanted into nursery lines, from whence, in another year they are in good condition for planting permanently out. Such is the general practice of the nurseries, but there are proprietors who raise their own trees, and plant directly from the seed-bed; in this case the planting iron is the instrument usually employed for the purpose, and with it a skilful workman will insert from three to nearly four thousand plants in a day. But where transplanted trees of one or more years old are used, the slitting or T method with the common spade is preferable as it affords a better bed and firmer receptacle for the enlarged roots, although a workman may not be able to insert nearly so many trees within the same time. In general from four to five thousand plants are allowed to the imperial acre in making plantations consisting exclusively of Scottish Pine; but such are now becoming comparatively rare even in the highland districts, as the larch is now largely introduced, being found to grow and thrive in soils of the same description, and at nearly as high an elevation

as the Pine. In the lowlands and in England plantations of Scotch fir are now seldom made except upon the poorest soils and most exposed situations, as it has been discovered that many other trees will readily grow upon ground that formerly was thought incapable of producing any other tree than the Pine; in consequence, that tree is now almost exclusively used as a nurse plant, to foster and protect the deciduous species, though even for this purpose we prefer the larch, and, where the soil will admit of them, the spruce and silver firs.

In the natural forests, after a fall of timber, all that is necessary to secure the reproduction of the Pine, is to keep the ground free for a certain time from the depredation and inroads of cattle and sheep, so that the seedlings may spring up unmolested and uninjured. In these forests, Mr. M'Pherson of Ballendalloch, a correspondent of Mr. Loudon's, remarks, "The plants spring up in thousands and of different ages, and being, consequently, of various sizes, the stronger gradually destroy the weaker, until the wood is reduced to the distances at which the trees can ultimately stand, whilst the lateral branches gradually decay and fall off, so that thinning and pruning are quite unnecessary." Mr. Grigor, also, in his report previously quoted, seems to consider these operations as scarcely necessary in respect to native forests, though it is occasionally done by some proprietors where the trees are very much crowded and of nearly equal size, especially when situated near a road or river, where the timber is of most value, "but this," he adds, "is not attended to in the more remote parts of the forest."

Artificial plantations, however, seem to require somewhat of a different treatment, for the trees being all planted at the same time, and of the same age, rise together of

equal size and strength; it therefore becomes necessary to thin out a certain proportion, in order to secure a crop of large timber, and this ought gradually to be effected, as they get too close, and are drawn up too tall and slender for their girth. Thinning, however, ought not to be commenced too soon, for as the value of Pine timber depends upon its length and cleanness of stem, and as this is produced by the decay and falling off of the lateral branches, the first thinning should not take place until several tiers of the lowermost branches are actually dead, this may then be repeated as often as the trees seem to require additional room and air, until they stand at distances sufficient to ensure them reaching their full dimensions. In regard to the question of pruning, or divesting the Common Pine and other *Abietinæ* of their branches, there are different opinions, some recommending the excision of a certain proportion of the living as well as the decayed branches, while others strongly object to the removal of any branches while alive, and would even leave such as had died a natural death to fall of themselves. Of the two opinions here stated we decidedly coincide with the latter, for we consider that the lopping of living branches from any of the *Abietinæ*, is always injurious to the health of the individual, and in regard to branches that have undergone a natural decay we have frequently observed, and particularly in the *Pinus sylvestris*, that the timber of such trees as had naturally freed themselves of their side branches, when cut up, did not exhibit larger knots, or these in a more decayed state, than in trees where the dead branches had been pruned or cut off. Indeed, it will be perceived by attention to the natural process, that where the decayed branches are, as it were,

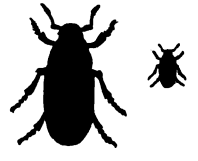
thrown off, there the decay ceases, the interior part or knot being of hard consistence and full of resin.

Besides the heart-rot to which Matthew says the Scotch fir is liable in wet ungenial soil, there is another disease to which it is subject, and which proves frequently fatal in our own and other plantations in the north of England, but which hitherto has not been observed to affect the trees in their native forests or in the highland districts. This is caused by the attack of a cryptogamic plant, the *Æcidium pini*, beautifully figured in Dr. Greville's "Cryptogamic Flora," pl. 7. vol. i. In general, the leaves only are affected, and then seldom to such an extent as seriously to injure the tree; but, in the instances to which we allude, it attacks the bark, sometimes of the larger branches, but more frequently of the main stem itself, and this, in many instances, when the tree is thirty or forty years old. When the Æcidium attacks a tree, the place is easily recognized by the swollen appearance of the bark, and it becomes still more conspicuous when the cysts begin to discharge the orange-coloured powder, or *sporidia*, with which they are filled. The bark, by the growth of this parasite, becomes completely disruptured, and its texture destroyed at the place of attack, and in consequence a great flow of resin ensues, and the tree usually dies in the course of a few months. Previous to the appearance of the *Æcidium*, we have not observed that the trees attacked showed any symptoms of decay or ill-health, though we are strongly inclined to believe that there must be some predisposition in such individuals to receive the *sporidia* of the parasite. The only accident of any consequence to which the Pine is liable results from heavy falls of snow, which, when unattended by wind, sometimes accu-

mulates in such masses as to snap in sunder or tear from their sockets the long and often nearly horizontal branches of this tree.

The insects which feed upon the *Pinus sylvestris* are numerous, and belong to various orders of the class: some live upon the foliage, others upon the wood, either in a fresh or decaying state; others again are subcortical feeders and live upon the inner portion of the bark, and some few confine their depredations to the decaying roots. Most of the leaf-eaters consist of the caterpillars of the *Lepidoptera*, and those of the *Tenthredinous* section of the *Hymenoptera*. Of the *Sphingidæ*, there is the caterpillar of the *Sphinx pinastri*, a large and beautiful species but of rare occurrence in Britain. *Eutrichia pini*, belonging to the Linnean *Bombyces*, whose caterpillar is covered with hair which causes great irritation when handled, is also occasionally met with. Of the *Lithosiidæ* three or four species feed occasionally upon this fir. Amongst the *Noctuidæ*, is *Achatia piniperda*, fortunately of rare occurrence in this country, but sometimes very destructive to the continental Pine forests. Of the *Geometridæ* the *Bupalus piniarius* is far from uncommon in the north of England, and appears to be upon the increase. Of the smaller moths belonging to the *Tortricidæ* and *Tineidæ* there are several species, among them *Œcophora oliviella*, whose caterpillar subsists upon the half-decayed liber of dying trees. Amongst the *Tenthredinæ* the pseudo caterpillar of *Lophyrus pini* sometimes commits great ravages, but its visits are uncertain and at considerable intervals. Though most of the wood-borers or internal feeders belong to the *Coleoptera*, we may here particularize the larva of the genus *Sirex*, Linn: (*Urocerus* Geoff.) belonging to the *Hymenopterous* order. In a perfect, or winged state, some of

the species resemble hornets as to size and colour; the females are provided with a strong horny ovipositor, by means of which they deposit their eggs beneath the bark of the tree, and the larvæ, as soon as hatched, commence boring into the wood in various directions. Of the *Coleopterous* wood-borers, the *Hylobius abietis*, one of the largest of the British *Curculionidæ*, is plentiful in the north of England and Scotland, but we have not ascertained that it does serious injury to the trees, its larva subsisting upon the decaying roots; *Pissodes pini*, another of the weevil tribe, and very destructive to the Pine upon the Continent, is rare in this country. Of the *Bostricidæ*, which come under the designation of subcortical feeders, the species of the genus *Hylurgus* have always been supposed to be particularly injurious to the Pine, and amongst them none more so than the *Hylurgus piniperda*, represented in the annexed cut. The attack of this insect upon the Pine, like that of the *Scolytus destructor* upon the elm, seems very generally believed to be the immediate cause of the decay and death of the tree; this, however, we are convinced is not the case, for after many years of attentive observation, we have never in one single instance found the *Hylurgus* attacking a tree in perfect health; in all cases, and these are by





no means unfrequent in our plantations, the tree, previous to the attack, is always observed to be in an unhealthy state, indicated by diminutive shoots, hide-bound appearance and yellow tinge of the foliage, and would eventually die, even if defended from the access of the *Hylurgus*. In short, the liber, or inner bark of the tree, must be in a certain state of incipient decay, before it becomes a proper food for the larva of the *Hylurgus*. As soon as a tree falls into this state, it is immediately resorted to by the perfect insects, which bore through the outer bark, and then proceeding in an upright direction, deposit their eggs on each side of the canal they eat out, and from whence each young grub diverges at an angle, and continues to eat its way till full-grown, when it changes into a nymph, and when perfect makes its way through the outer bark. In its imago state this insect also attacks the young shoots of the Pine, entering horizontally at the lower part, and excavating its way upwards through the heart of the shoot, and thus destroying it; but as the side and smaller shoots are generally selected, we have seldom seen any serious injury done to the trees thus attacked. To the same family belongs the genus *Tomicus*, whose species are also considered to be destructive to the Pine, though we think further observations will probably show that they, like the *Hylurgus*, are not the proximate cause of decay, but subsequent to it. Amongst the *Cerambycidæ*, or *longicorn* beetles, the *Callidium striatum* is occasionally taken in Scotland, and *Rhagium bifasciatum* we find abundant in old decayed roots and posts of Pine.

Of the *Pinus sylvestris* there are several marked varieties in Britain, differing not only in form and habit, but in the size and quality of their timber. In some the wood

is white, soft, without resin, and perishable; in others it is firm, resinous, red-coloured, and durable; it therefore becomes a matter of the first importance to the planter that the nurserymen from whom he procures his trees should be very particular in the selection of this seed, and that the people he employs to collect the cones should have directions as to the trees from which they ought to be gathered. This, indeed, becomes the more necessary, as the inferior variety produces cones much more freely than the other, and when no restriction is enforced or particular directions given it is natural to suppose that the seed-gatherer, when paid for quantity and not for quality, will collect the cones from trees on which they are most abundant and can be most easily procured. It is from this inattention to the collecting of Pine seed, that the introduction of the inferior variety in so large a proportion as compared with the better kind in so many Pine plantations may be attributed, and not, as Sir Walter Scott mistakingly supposed, to the introduction of an inferior variety from Canada, in which country, and other parts of North America, the *Pinus sylvestris* is not an indigenous tree, and from whence no seed could be obtained. The three principal varieties of the *Pinus sylvestris* in this kingdom were first accurately described by Mr. Don of Forfar, in a memoir published in the first volume of the Caledonian Horticultural Society. The first, to which he gives the title of *Pinus sylv. vulgaris*, Common Wild Pine, is distinguished by its close pyramidal head, the branches growing upwards at an acute angle with the trunk, the leaves marginated and of a dark green, without any glaucous appearance beneath, and the bark of the trunk very rugged. This variety, he remarks, seems to be but short-lived, becoming soon stunted in

its appearance, and is altogether a very inferior tree to either of the other two varieties. It is also the same which unfortunately predominates in so many artificial plantations, and whose inferior qualities have tended to bring additional discredit upon the Pine; it also seems to be the variety to which Sir Walter Scott especially refers when he speaks of an inferior kind of *Pinus sylvestris* introduced from North America. Its cones, which are elongated and pointed, are produced in great abundance, a circumstance that unluckily tends to its extensive dissemination.

To the second variety is given the appropriate name of *Pinus sylvestris horizontalis*, from the horizontal direction of its branches, which spring at nearly a right angle to the trunk. The leaves are broader than those of the first variety, serrulated and not marginated, and of a fine glaucous colour on the under surface. The bark of the trunk is not nearly so rugged, and is of a rich yellowish brown colour. Its cones, also, are rounder, smoother, not so much pointed, and seldom produced in large quantity, like those of the first variety. It is a rapid, free-growing tree, of a hardy constitution, and attains a large size, not only in granitic but in other soils and situations, and loses its pyramidal form when old. This appears to be the variety producing the finest trees and best timber in the highland forests, and, we think, must be the same as the *Splatch Pine* mentioned by Mr. Matthew, and so called from the appearance of the rougher part of the bark, which is disposed in flat oblong lumps, and not in deep, longitudinal furrows as in the first variety. Of late years, the nurserymen in the north of Scotland have been particular in collecting

the seed of the best variety of the Pine, the example having first been set by the Messrs. Grigor, nurserymen at Elgin, and the good effect, we may remark, is already visible in the appearance of the Scotch Pine plants, in plantations made within the last fifteen years. Mr. Don's third variety is easily distinguished from the other two, for although it has the pyramidal growth of the first, its leaves are still more glaucous, or of a more silvery green than those of the second; its cones also are remarkable, in having the bosses of the scales elongated and bent backwards, in the form of blunt prickles, from which circumstance it received the name of *Pinus sylvestris uncinata*. It is not, however, to be confounded with the *Pinus uncinata* of Captain Widdrington, a species certainly nearly allied to *Pinus sylvestris*, but which inhabits a still higher zone, and whose distribution seems confined to the mountain ranges of the peninsula. This variety in the Scottish forests is of more frequent occurrence than the *Pinus sylvestris horizontalis*, and produces an excellent timber. Amongst the continental varieties the *Pinus sylvestris Haguenensis*, *(Pin. de Haguenen,)* seems one of the most valuable, producing tall, straight, clean timber. The bark is of a reddish colour and remarkable for its smoothness, and its leaves, which are of a light and slightly glaucous green, are serrulated and much waved or twisted. Seeds of this kind were brought over by Mr. Loudon, and young trees reared from them are now growing and thriving in Perthshire. Young plants are also to be obtained of Mr. Lawson, nurseryman at Edinburgh.

We shall now proceed to make a few observations upon certain species of the genus *Pinus*, which, from their habit and hardy constitution, promise to thrive and attain their

full dimensions in a British climate, and whose timber is of a quality likely to repay the planter, when cultivated upon an extensive scale.

The first to which we direct the attention of our readers is the *Pinus uncinata*, mentioned by Captain S. E. Cook, now Widdrington, in his "Sketches in Spain," which, though nearly allied to the *Pinus sylvestris*, and supposed by Loudon to be identical with the *Pinus sylvestris mughus* of botanists, possesses characters sufficiently marked and important to entitle it to rank as a distinct species. It is a native of the Pyrenees, inhabiting the highest zone, or line of forest vegetation, on both sides of that chain of mountains, for Captain Widdrington remarks, "though mixed at first with the *Abies (picea) pectinata*, (silver fir,) and the *Pinus sylvestris*, it gradually, as you ascend, leaves them below, and occupies exclusively the Siberian region of the high or central Pyrenees." Besides this hardiness of constitution, which points it out as a tree admirably adapted for our highland districts and lofty elevations, it possesses many other qualities which render its cultivation upon an extensive scale particularly desirable, for the same author informs us that it grows to a noble size with a bold, commanding form, and a massive foliage of a deeper green than that of *Pinus sylvestris*, so much so as to be distinguished by the Spanish woodmen by the appellation of *Pino negro*, the two varieties of the Common Pine being called the one *blanco* and the other *roxo*. Its timber is also of first-rate quality, being firm, strong, and highly resinous, and in its own country preferred to that of the *Pinus sylvestris*. Another important feature is its power of resisting storms of wind, which it does to such an extent that Captain Widdrington remarks, when speaking of the constant winds which

rage in the upper regions of the Pyrenees, "In these inclement regions, where I have observed the tree in every form and situation, I never saw an instance where the wind appeared to affect it, nor where it showed a weather side." We would, therefore, recommend it to be tried, provided plants or seed can be obtained in sufficient quantity, upon elevated tracts of the Scottish highlands, or upon the mountainous districts of Wales, Cumberland, and Westmoreland.

Another species, apparently deserving of more extended cultivation, is the *Pinus laricio*, (Corsican, or Larch Pine,) which tree, though inhabiting a lower zone than the *Pinus sylvestris*, is sufficiently hardy to thrive in any part of Britain except in the more elevated mountainous regions. It is a tree of handsome form and appearance, the leaves long, slender, and of a very deep green. In Corsica it is said sometimes to attain a height of one hundred and forty to one hundred and fifty feet, but its general height may be stated at from eighty to one hundred feet. Its growth, in a favourable soil, which we consider to be a dryish, gravelly, or sandy loam, is much more rapid than that of the Scotch fir, its annual leading shoots often being upwards of two feet in length, and it is stated in the "Gardener's Magazine," that, in an instance where two plants, one of *Pinus laricio*, the other of *Pinus sylvestris*, had been planted together at the same time and at the same age, in the course of eight years *Pinus laricio* had attained a height of upwards of twelve feet, the *Pinus sylvestris* not more than seven. In France, according to Thouin, *Pinus laricio* grows two thirds faster than the Scotch Pine, placed in a similar soil and situation. As an ornamental tree it is not inferior to the Pinaster, and has the advantage over that species of always re-

taining an upright position and rooting itself more firmly in the ground. Its timber, also, though inferior in elasticity to that of the Common Pine, is of a quality much superior to that of the Pinaster, and by the French has been used extensively in ship-building, as well as for the masts of vessels. It is also in request with the cabinet-makers and sculptors in wood, as it works easily and smoothly under the plane and chisel. It is a native of Corsica and various other parts of Europe, and also abounds in the Caucasus and in the south of Russia. It was first introduced into England in 1759, under the name of *Pinus maritima*, having been confounded with that variety of the Pinaster now known under the title of *Pinus pinaster maritima*, and it was not until 1822 that it received its present specific name of *Pinus laricio*. The largest British specimen appears to be that growing at Kew, which is nearly ninety feet high, and at White Knights Loudon mentions one, thirty-seven years planted, as being sixty feet high.

Nearly allied to the *Pinus laricio*, of which species it is by some considered a variety, is the *Pinus pallasiana*, Lamb. It differs from that tree in having the leaves* stronger, and exhibiting a more massive foliage, of a lighter green tint. The cones are larger, being from four to five inches long, and from one inch and a half to one and three quarters broad, of an ovate oval shape, acuminate, and often slightly recurved at the extremities. The central bud is upwards of an inch long, ovate, with a sharp point, and dotted with closely adpressed, chaffy, linear-like scales.



* The leaves on the opposite page are reduced to half their natural size.

It is described by Lambert "as a large tree, about the size of *Pinus sylvestris*, but much more spreading, sending out numerous large, declining, and horizontal branches from the summit to the base, the lower branches almost equalling the trunk in size." This description of the large size of the lower branches answers to the growth of some Pines we procured about fifteen years ago, under the name of *Pinus Tatarica* or *Taurica*, now considered synonyms of *Pinus pallasiana*. Our plants are very hardy in constitution and grow rapidly, their annual shoots being nearly two feet in length, but their growth is fastigiate and not spreading; they also establish themselves firmly in the ground, and have never suffered from our severest storms of wind or snow, and we consider it, if not as a timber tree, at least as an ornamental appendage well worthy of cultivation.



By Pallas, its wood, though knotty, is described as being very durable and full of resin.

The *Pinus Austriaca*, Austrian or Black Pine, *Pinus nigrescens* of some of the German botanists, is another species lately introduced, which promises to be a most valuable addition to our sylva. It is nearly related to *Pinus pallasiana* and *Pinus laricio*, but seems to possess characters sufficiently marked to warrant its separation from them as a botanical species. The bud is narrower than that of the *Pinus pallasiana* and coated with a white resin. It is a native of Austria, in which country it possesses an extensive range, covering, according to Captain Widdrington,* a considerable portion of the plain to the

* See paper "On some species of European Pine," by Captain Widdrington, R.N., in No. 49, "Annals and Magazine of Natural History."

south and east of Vienna; it also clothes the lower part of the Semereng range and the hills near Baden, and ranges to the south of Styria. Loudon remarks that in the neighbour-





hood of the snowy mountains it grows at higher altitudes than the silver fir, and Captain Widdrington assigns it a zone immediately below that of the *Pinus sylvestris*; at the same time, he adds, "there is no question that it is sufficiently hardy to resist any cold to which it is liable to be exposed in these islands."

It was first introduced into Britain by Mr. Lawson of Edinburgh, in 1835, who raised a large number of plants from seed brought from Germany, and we may here remark that plants of this species, now six years old, outstrip in strength and size those of the Common Pine placed in the same soil and situation.

It is described in its own country, as a large handsome

tree of rapid growth, becoming flat-topped and spreading to a great extent when old, and rendered highly ornamental by its thick, tufted, dark green foliage. In Austria, its timber is considered as rather superior to that of *Pinus sylvestris*, being tough, strong, and resinous, and capable of resisting to a greater extent the effects of alternate moisture and dryness.

The only drawback we have found to the cultivation of the Austrian Pine, is the liability of the young trees to the attacks of hares and rabbits, which seem to prefer it to any other species of fir, and are sure to find out the plants, however thinly they may be disseminated in mixed plantations, and, as the buds are eaten as well as the foliage, they suffer an injury that is seldom repaired. In districts where game of this description abounds, it might be advantageous and advisable to try the herbaceous grafting of the *Pinus Austriaca* upon the Common Pine, a mode now adopted with great success in propagating many of the tenderer and rarer of the *Abietinæ*. Herbaceous grafting is so named from the state of both stock and scion at the time of the operation, which is performed when the leading shoots of the fir tribe have commenced growing, and are so tender that they may be snapped off by the hand, without tearing the bark, like a piece of glass or the succulent stem of the young asparagus. Cleft grafting is the mode adopted in this operation, the shoot representing the stock being slit so as to receive the lower part of the scion, which is pared or cut into a wedge-like shape, as shown in the figure.

In performing herbaceous grafting, we are directed, in the first instance, to break over the leading shoot, when in a brittle state, in which it remains for only about ten days or a fortnight, reducing it to four or six inches in

length; the leaves, with the exception of two or three near the top, which are to be left for the purpose of drawing up the sap, are then to be removed by a sharp knife or pair of scissors, and the slit made to receive the scion, which should be taken from the extremity of the branches of the kind to be grafted when in the same succulent state, either the same day or the evening before, and kept in water or damp moss. The scion need not be more than two or two and a half inches long, and the lower half, being deprived of its leaves, is cut in the form of a thin wedge and inserted and fitted into the slit of the stock, in which it is further secured by a ligature of soft twine, matting, or worsted twist. As the exclusion of the direct rays of the sun facilitates the junction of the scion with the stock, a cornet of paper is usually tied to the stock, so as to shade the scion from its influence. In ten or fifteen days the cornet may be removed, and a fortnight afterwards the union is sufficiently effected to allow of the removal of the ligature, after which the upper part of the stock left with the leaves on may be trimmed off, and the side shoots on the lower part of the stock removed, so as to throw the whole of the sap into the scion. By this mode of grafting, many species and varieties of the *Abietinæ* of which it is difficult to procure a supply of seeds or plants may be extensively propagated, as it is done with rapidity, a good workman, with an assistant to prepare the scion, &c., being able to graft upwards of two hundred a day. Its success, also, if done





at the proper time, is almost certain, union between the stock and scion seldom failing to take place within three weeks or a month. It is desirable, however, in this mode of grafting, that the stock and the scion should be nearly allied, or belong to the same genera or divisions of the family, and also that the stock should be of a growth and habit resembling that of the scion; for we have observed that when a scion of large and strong growth has been grafted upon a tree of less succulent or rampant habit, the graft became swelled and much larger than the stock at the point of junction, as shown in the figure, threatening, in the course of a few years' growth, to become much too heavy for the stock to support it, and liable to be broken, or blown off by winds or storms of snow. Such appeared to be the case in some instances that have come under our notice, where the *Pinus Sabiniana* had been grafted upon the *Pinus laricio*.



To the Pines already enumerated may be added the *Pinus Peyrenaica* of La Perouse, the *Pinus Hispanica* of Captain Cook,* now Widdrington, who first introduced it into Britain, and who speaks highly of its noble appearance, elegant form, and quick growth, and recommends its cultivation, as one of the most ornamental Pines for park and landscape scenery. Its timber he describes

* See Captain Cook's "Sketches in Spain," and article in vol. ii. of "Annals of Natural History," page 163.

as white, dry, and nearly without turpentine; it may therefore be presumed, that it is better adapted for interior joiner work than for large building purposes, such as joists, rafters, &c., or for situations where it is subjected to alternate dryness and moisture. The leaves are long, slender, tufted at the extremities of the shoots, of a light grass green colour, and, therefore, contrast beautifully with the darker green of many of its congeners. When young, it bears some resemblance to *Pinus Halipensis*, but is of a much more vigorous growth, more pyramidal in form, and attains a much greater height and larger dimensions. The cones are nearly three inches long, on strong footstalks, and, though resembling those of *Pinus Halipensis* in the form of the scales, &c., instead of pointing downwards, as in that tree, are always attached to the branches in a horizontal direction. It grows in the Pyrenees at an elevation of from two to four thousand feet, and is, therefore, of a constitution hardy enough to flourish in any part of Britain. Thriving young trees of this species, raised from seed brought from Spain by Captain Widdrington, are now growing in several parts of England.





Pinus pinaster. Ait.

PINASTER, or CLUSTER PINE.

Pinus pinaster	Ait. Hort. Kew. iii. p. 367.
	Lamb. Pin. i. t. 9.
	Lawson's Man. p. 341.
	Loudon's Arb. Brit. ch cxiii. p. 2213.
Pinus maritima	Nov. du Hamel v. p. 240.

The introduction of the Pinaster into England by Gerard so early as A.D. 1596, the extent to which it has been

cultivated in many districts, as well as its ornamental qualities, entitle it to some notice in a work like the present, though it cannot be recommended as a species valuable for its timber, or calculated to repay the planter for its occupancy, in soils capable of producing wood of more general utility. In the quality and texture of its wood it is greatly inferior to the Common Pine, as well as to the other species whose cultivation we have already recommended, and, even in its ornamental properties, it does not, we think, surpass the *Pinus laricio*, *Pinus pallasiana*, or the *Pinus Austriaca*, all of which occupy a higher zone, that is, grow in a colder climate, and are, therefore, better calculated for extensive cultivation throughout the varied surface of the British Islands. It possesses, however, a constitution and habit which render it of great importance in certain localities, being a species that bears with impunity, indeed thrives within, the influence of the sea air, at the same time that it affects a deep soil of a light sandy nature, and even grows with vigour upon tracts of pure sand. Such are those extensive woods of the Pinaster which cover so large a surface of the sandy downs along the southern coast of France, the Landes of Bordeaux, &c., in which districts its produce, consisting chiefly of the tar, resin, &c., extracted from the wood, constitutes a principal source of the riches of the inhabitants.

This predilection for a maritime situation, and a constitution sufficiently hardy to brave the vicissitudes of our climate at a low elevation, point out the Pinaster as the most appropriate, indeed, we believe, the only species of Pine that can be reared with any prospect of success within the direct influence of the sea air, and upon such tracts of our coasts as are chiefly composed of sand. For such a habitat, how-

ever, it is further adapted by the nature and character of its roots, which are less numerous, but more carrot-like in form, and descend much deeper into the earth than those of most other species of Pines, in which the roots are generally superficial and extend horizontally on every side, to a great distance around the tree, and which, upon a surface soil, gives that stability to them, which in the Pinaster, upon deep sands, is effected by a few bulky tap-formed roots, which descend deep into the stratum. This peculiarity in the root of the Pinaster, possessed also by its nearly-allied congener the *Pinus Pinea*, Stone Pine, is adverse to its cultivation upon soils of inferior depth, or where the substratum is hard or rocky, for upon such, in consequence of its inability when young to protrude to a sufficient depth a powerful root which may serve as a counterpoise to the leverage of the plant above ground, it is acted upon by the winds, becomes loosened in its socket, and inclines to one side, whence it is that few Pinasters, when planted upon such soils, are to be seen with a bole perfectly straight and upright near to the ground, a curvature being generally perceptible, even in trees of considerable age and size. This want of lateral roots, also, renders it liable, in districts subject to heavy storms of wind, to be broken off close by the crown of the root, where we have sometimes observed a kind of imperfect junction to exist between a portion of the bole and the main root, as expressed in the figure. At Twizell, during the tremendous storm of wind on the 9th of January, 1839, a luxuriant Pinaster upon the lawn, which, at about twenty-two



years' growth, had reached a height of thirty-three feet and a circumference of nearly four feet, was broken off in this manner, and the appearance of the crown of the root was similar to that represented in the figure.

To succeed and become an ornamental tree the Pinaster requires room and air on every side, and it is, therefore, in vain to place it in mixed plantations, as it either dies in its infancy, choked by its more hardy and enduring neighbours, or lingers for a few years, a feeble and unsightly object. Even when planted in masses by itself, the young trees, when first put in, ought to stand at least from eight to twelve feet apart, and should afterwards be thinned out as soon as they interfere with or touch each other.

Greatly, therefore, as we admire the Pinaster for its massive and clustered foliage, its bold form, and the rich appearance of its large nut-brown cones, we consider that, upon soils not expressly adapted to its habit, it would be more advantageous and satisfactory to substitute some of the other species of a similar character in regard to foliage and general effect, such as *Pinus laricio*, *Pinus pallasiana*, or *Pinus Austriaca*, which have the additional advantage of being more hardy in their constitution and of producing timber of a superior description, reserving the Pinaster as a tree wherewith to shelter and adorn maritime sandy tracts, upon which it is known to flourish, and where few other trees can be made to succeed.

It possesses an extensive distribution throughout the south of Europe, occupying a zone considerably lower than the *Pinus sylvestris*. In Spain it is an abundant species, and in the maritime districts of the south of France covers a large extent of surface, but it cannot be cultivated, with a view to profit, to the north of Paris. It is, also, common to Italy and Switzerland, to Greece and the western parts

of Asia, and a Pinaster from seed imported from China has been raised in the garden of the Horticultural Society, though there is some doubt whether the species had not been originally carried from Europe to that country. The growth of the Pinaster in a suitable soil is rapid and luxuriant, and in the course of fifty or sixty years it reaches a height of from forty to as much as sixty feet, with a trunk of corresponding diameter. Its leaves are from six to eight inches long, very strong and rigid, of a lighter green than those of *Pinus laricio*, and are thickly-clustered towards the ends of the branches, an appearance rendered still more striking by the bare spaces left at the bottom of each annual shoot by the decadence of the male catkins, which, when in bloom, surround the lower part of the shoots. The sheaths containing the leaves are nearly three quarters of an inch long, imbricated, and, when old, of a blackish colour. The bark of the trunk is always deeply-furrowed and of a dark brown colour, and the terminal buds are large, covered with brown, chaffy, involuted scales, and perfectly free from any resinous coating. The cones, which frequently measure five inches in length, are placed in whorls round the branches, pointing outwards in star-like clusters, from three to as many as seven or eight together; they first appear upon the shoots of the current year of a purplish colour, then change to green, and when matured, which takes place in the autumn of the second year, become of a rich and shining brown. The scales, which are an inch and a half in length, terminate in regular rhomboidal pyra-





mids, whose summits consist of a smaller pyramid of a greyish colour, hard and sharp-pointed. The seeds, a little more than a quarter of an inch long, are attached to a large membranous wing, which is upwards of an inch in length, and the cotyledons of the seedling are seven or eight in number.

Many fine examples of the Pinaster are to be met with in various parts of England; in the gardens of Fulham palace there is one upwards of eighty feet high, with a trunk more than twelve feet in circumference; at Sion House, Loudon mentions several above sixty feet high.

In Hampshire, Cornwall, and Norfolk, it has been planted extensively, and in all these counties there are Pinasters of fine growth and large dimensions. In Northumberland, we recollect a very fine and highly ornamental tree which grew in the neighbourhood of Belford, but which fell a sacrifice to the axe, being mistaken for an ancient individual of the common species. At Twizell, besides the tree blown down by the hurricane of January, 1839, there are now several, about fourteen years planted, upwards of twenty feet high; and at Howick, the seat of Earl Grey, are several thriving trees of this species.

Several varieties of the Pinaster are enumerated by Loudon, amongst which the *Pinus P. Lemonianus** is the most remarkable; for, although similar in foliage to the species, it differs in its general habit and mode of growth.

* For a further account of this variety, our readers are referred to a paper by Sir Charles Lemon, published in the "Horticultural Transactions."

In this variety, the cones, instead of being placed behind the shoots of the whorl and pointing outwards, three, four, or more together, are single, each invariably occupying the place of the leading shoot, while the side shoots are behind it, a mode of growth that necessarily deprives the tree of its regular leader. This deficiency, however, is in fact compensated by a more vigorous growth of one of the side shoots, which then becomes a leader; but as this process is repeated year after year in different directions, the stem of the tree acquires a zigzag appearance, which it always retains. In its general form, and when it has acquired age and size, it resembles a thick, bushy, round-headed Pinaster, but without any unhealthy or dwarfish aspect. At Carclew, the seat of Sir Charles Lemon, where the variety first appeared, there are many fine specimens upwards of thirty feet high. Seedlings raised from the cones mostly retain the same character, which is said to be already observable in plants of three or four years old.

Before closing the description of the Pinaster, we may briefly remark, that the *Pinus Pinea*, Stone Pine, which in Italy and other warm parts of Europe attains a noble size and picturesque form, and which enters so beautifully, and with such marked effect, into the compositions of Claude, is of too tender a constitution to thrive or attain its full dimensions in England, specimens, even in the warmer southern counties, rarely advancing beyond the character of a large bush. At Twizell, where numerous plants were raised from seed about twenty-five years ago, and afterwards treated with great care and attention, the whole are now dead, after having attained a height of about fourteen feet. When twelve or fourteen years old, they began to bear cones, and continued to do so in profusion till their death, but the nuts rarely contained a kernel so far advanced as to vegetate.



Pinus strobus. LINN.

WEYMOUTH PINE.

Pinus strobus

LINN. sp. pl. 1419.
NEWT. Eve. Sylv. p. 263.
AIT. Hort. Kew. iii. p. 369.
LAWSON'S Man. p. 360.
LOUDON'S Arb. Brit. ch. cxiii. p. 2280.

OF the Pines distinguished by having five leaves enclosed in a sheath, the *Pinus strobus* is the only species

whose introduction goes back for any number of years, or which has been cultivated to any extent within the British Islands. In tracing its history, it appears to have been first grown by the Duchess of Beaufort, at Badmington, in 1705. Soon afterwards, it was planted in considerable numbers at Longleat, in Wiltshire, by Lord Weymouth, from whom it derives the name of the Weymouth Pine. Many, also, about the same period, were planted at Mersham Hatch, in Kent, and the Duke of Argyle cultivated it extensively at Whitton. In these various situations it grew with vigour and considerable rapidity, and, in the course of sixty or seventy years, many of the trees attained a height of from seventy to eighty feet. In the northern parts of England and Scotland, however, it seldom attains so great a size, or reaches the age above-mentioned, most of the trees decaying, when about forty years old. This may, perhaps, partly be attributed to the want of the necessary degree of temperature during its period of growth; for, though subjected in its native country, during winter, to greater degrees of cold than we usually experience here, it enjoys, during the period of its activity, a temperature generally much higher than that of the northern parts of our island. This tenderness or delicacy of constitution, may likewise, we think, be partly owing to the origin of the plants, for most of the Weymouth Pines disseminated through the kingdom have been raised from the seed procured from the trees originally introduced at the places previously mentioned, or from their descendants; these, it is probable, are deteriorated by climate, difference of soil, &c., and, therefore, incapable of producing a plant with a constitution equal in strength and vigour to trees raised from seed ripened in the native habitat of the species; a case, in fact, ana-

logous to what has already been mentioned in regard to the deterioration of the Scotch Pine, when raised from seed grown in England and upon soils uncongenial to its nature.

The failure of the Weymouth Pine as a profitable tree to the planter, and the comparative neglect into which it has fallen, being now seldom planted, except for the sake of variety or ornament, is the less to be regretted, as other species have been introduced of a more hardy constitution, and producing wood much superior in quality, so far at least as regards strength, elasticity of fibre, and durability. The wood of the Weymouth Pine is white or very pale yellowish white, of a fine grain, light, and very soft, but with little strength and not calculated to withstand the effects of alternate dryness and moisture; for the interior finishing of houses and fine joiner work it is an excellent material, being easily worked, and taking a fine satiny surface under the plane; it is also, in general, very free from knots, the lower side branches being small, and, in the thick American forests, perishing at an early age. Its want of strength, however, renders it greatly inferior to the Scotch and many other species for beams, rafters, and other important parts of the woodwork of houses, added to which it is much more susceptible of, and predisposed to, the dry rot. It is, therefore, to be regretted that wood of a character so much inferior to that of the Common Pine, or, as it is usually called, Baltic timber, should, from the operation and unequal bearing of our fiscal regulations in regard to the importation of timber, be used so frequently for the main timbers of buildings, its exemption from the high duty charged upon the superior article from the Baltic enabling the merchant to sell it at a much lower price, of which advantage is taken by specu-

lating and contract builders, who feel but little interested in the durability of their erections. In consequence of its exemption from duty, the importation of the Weymouth Pine timber into Britain from our North American colonies is of immense extent, and likely so to continue, at least, as long as the present impolitic restrictions continue in force, and prevent a more abundant and adequate supply of a superior description of timber from the north of Europe.

The Weymouth Pine is a native of North America, being found in great abundance, and occupying large tracts from Canada to Virginia. According to Michaux, it attains its largest dimensions in New Hampshire, Vermont, and near the commencement of the river St. Lawrence, where the largest specimens are found growing in the soft, friable, and fertile soils of the valleys, or in the deep, black sandy loam of the banks of rivers. In such situations, it sometimes reaches a height of one hundred and eighty feet, and the above-named author mentions two trunks, felled for canoes, that he measured, one of which was one hundred and fifty-four feet long and fifty-four inches in diameter near the butt, the other one hundred and forty-two feet long and forty-four inches in diameter. In these deep, loose, and moist soils it possesses, in the highest degree, those qualities which characterize its timber; being lighter, finer in grain and texture, and softer than when grown upon more elevated and drier tracts, where the wood is coarser, but firmer and more resinous. In America, the White Pine, as the wood of this species is called, is extensively used and for a great variety of purposes. Its fine grain, soft texture, and the ease with which it is worked and cut in every direction, adapting it for the interior and decorated wood-work of

houses, such as friezes, mouldings, cornices, &c.; it is, also, almost exclusively used, in the northern and middle states, for the masts of vessels, which are superior to any others for their lightness, but in point of strength and durability, particularly in that portion placed between decks and at the intersection of the yards, are inferior to those of the *Pinus sylvestris* and other species of the north of Europe. The clap-boards, with which the wooden walls of American houses are covered, are, also, generally sawn out of the White Pine, and the shingles, or wooden tiles, are split out of the most perfect wood, or that which is freest from knots; these make a light and efficient covering, but require to be renewed every twelve or fifteen years.



The figure here introduced represents a Weymouth Pine, of remarkable form, in the grounds of Strathfieldsaye.

The *Pinus strobus* is stiff and formal in its appearance, retaining its pyramidal growth, even when old and full grown; its foliage, also, is thin and meagre, and destitute

of that tufted or massive richness which is seen in the Common Pine, the Pinaster, and other two-leaved species; hence, as an ornamental tree, it is greatly inferior to many of its congeners; and, possessing no picturesque beauty in itself, it is only desirable where the direct effect of contrast is required, as where its smooth and polished grey-green bark is opposed to the rougher and more richly-coloured trunks of the *Pinus sylvestris*, or its light and scanty foliage relieves the heavier masses of surrounding trees.

Specifically, it is distinguished by having the leaves in fives, with little or no surrounding sheath at their base, slender, from three to three and a half inches long, of a light bluish green, with longitudinal silver lines, scabrous, and finely serrated on the margin. In summer they hang free and loose, but in winter, and during frost, they contract and lie close to the branches. The buds are ovate, pointed, and partially covered with resin. The male catkins are short and elliptic, on long footstalks, their colour a pale purple mixed with yellow. The crest of the anthers is small and composed of two short erect bristles. The cones are of an ovate cylindrical shape, erect when young, but as they reach maturity become pendulous; they are from four to six inches long, slightly curved, and composed of smooth scales rounded at the base, with the apex thickened and partly covered with white resin. The seeds ripen and are shed from the cones in the October of the second year.

There is another species belonging to the five-leaved section, to which it is desirable to direct the attention of planters, particularly of those who possess extensive tracts of land of a hilly or mountainous description, this is the *Pinus cembra*, Linn., Cembran Pine, a tree of the hardiest constitution, naturally growing in the Alpine regions of many

parts of Europe, as well as those of Tartary and Siberia, at a high elevation, and occupying a zone even above that of the *Pinus sylvestris*. It is, therefore, a tree, as Mr. Lawson remarks in his "Manual," "well adapted to clothe the tops of many hitherto almost barren mountains in Scot-



land, not only with fresh and luxuriant vegetation, but with valuable timber." In the latter respect, it is said to yield to none of the genus, its wood being not only remarkable for its durability in all situations, but for its agreeable perfume, fineness of grain, and the ease with which it is worked. In Switzerland, it is in great repute with the

turners, and is also much used for the wainscoting of apartments, both on account of its agreeable colour and of the sweet odour which it always retains. From the ease with which it is cut and moulded into form, it is, also, the material from which the various figures of men, women, animals, &c., are carved by the shepherds of the Swiss and Tyrol Alps during their hours of leisure. Hitherto its cultivation in Britain has been very limited, and mostly confined to a few places in England, and in situations, we believe, not congenial to its nature, and where it is not likely to attain its full developement. To give it a fair trial and test its value it ought to be planted in our mountainous districts, at different elevations and in different exposures, upon the open face of the hill, as well as in the gullies and deep hollows, where the soil is generally the best, and, from the free percolation of moisture, especially congenial to the growth of trees. To an extended cultivation of the Cembran Pine, it may, perhaps, be objected, that its growth is too slow to repay the planter for its occupancy; but when we consider the elevated situations on which it is proposed to try it, the comparatively trifling value of the land in such mountainous districts, and the great advantages to be derived from the shelter alone that plantations of this species would afford to flocks depastured on the hills, it seems to be an experiment well worth trying by those who are owners of mountainous property, without taking into account the satisfaction of adding to the interest and beauty of their country, as well as the prospect, though it may appear distant, of benefiting their posterity by the growth of a valuable timber in districts otherwise barren and unprofitable.

For the first four or five years, the growth of the *Pinus cembra* is slow, the annual shoots seldom exceeding two

or three inches in length; but after this age, and when it has obtained possession of the ground, it is much more rapid, its annual shoots, at least in the Swiss variety, or *Pinus c. Helvetica*, in tolerable soil of a dry quality, averaging about fourteen inches, and at Twizell, plants put out from the pot when about six inches high, are, after ten years' growth, nearly thirteen feet high. In some parts of England, as at Dropmore, it has attained a height of about fifty feet in as many years, and some of those at Walcot Hall, in Shropshire, planted towards the close of the last century, are about fifty feet high.

In its growth it is very erect and pyramidal, the branches, which are slender, growing in regular whorls from the base to the summit, and retained during life, where the trees have room and air. The leaves are from three and half to four inches long, with three longitudinal ribs, two of which are opaque and white, the other green and shining, thus producing a glaucous green foliage; they are in thick masses towards the ends of the branches, and in winter incline towards, or embrace the shoots, those nearest the buds being usually twisted around the tip, as if to defend those important parts from frost or the lodgment of snow, which, in consequence of this arrangement and the comparative slenderness of the branches, can rarely take place to any hurtful extent, a beautiful provision for the preservation of a tree that naturally grows in such high Alpine regions.



The cones are about three inches long and two and a quarter broad, the scales nearly as wide as long; the seeds are large, being about two-thirds the size of those of the nut Pine, *Pinus pinea*, and destitute of wings. They contain a sweet oily kernel, grateful to the taste, and used in some parts as food. An excellent oil, fit when fresh for the table, or to burn in lamps, is expressed from them in the Tyrol; and in Siberia, when the crop is abundant, they are said to form almost the sole winter food of the peasantry. When sown they lie long in the ground before they vegetate, the young plants not appearing till the spring of the second year.

To this section, also, belongs the *Pinus excelsa*, Wallick, Bhotan Pine, a native of the mountains of Nepaul, also *Pinus Lambertiana*, first discovered by Douglass, near the head-waters of the Multonal river, to the west of the range of the rocky mountains. Both of these species seem of hardy temperament, and are likely to prove important additions to our ornamental coniferæ.





Genus *Abies*. D. Don.

Abies excelsa. Decan.

COMMON, or NORWAY SPRUCE FIR.

Abies excelsa	Decan. Flor. Fr. 3.
	Nov. du Hamel, vi. p. 289.
	Loudon's Arb. Brit. ch. cxiii. p. 2293.
Pinus abies	Linn. sp. pl. 1421. Id. Flor. Suec. p. 875.
	Hunt, Evel. Sylv. p. 266.
	Ait. Hort. Kew. iii. p. 371.

As a species, the Common Spruce is distinguished by having the leaves scattered upon the branches, quadrangular; cones terminal, cylindrical, and pendant; scales naked and flat, their summits truncate; cones from five to seven inches in length, and from one and a half to two inches broad. Seeds winged, small. Cotyledons from seven to nine.

This stately and elegant fir, for such it must be generally acknowledged, when seen in full and vigorous health, and in a soil and situation congenial to its habit, is amongst the loftiest of the European coniferæ, yielding only, in this respect, to the *A. (pinea) pectinata*, Silver Fir, which, to a superior height, adds also a greater bulk and vastness of trunk. In its native districts, and in favourable situations, it attains a height varying from one hundred and twenty to one hundred and sixty feet, and even instances have been met with, in which it has reached the enormous altitude of one hundred and eighty feet. It grows in a spire-like pyramidal form, the trunk being perfectly straight and continuous from the base to the very summit, furnished on all sides with numerous spreading branches, disposed in regular whorls, which spring each year successively from the base of the terminal bud or leading shoot. These branches, where the tree has had sufficient air and room, are retained during life, except it may be a few of the lowermost, and those smaller shoots or abortive branches which occasionally appear between the regular whorls. In young trees the branches grow in a horizontal, or a slightly upward direction, but as they increase in size and age they become partially pendant, the extremities, however, always continuing to turn upwards, a disposition or form which gives a graceful and feathery appearance to the general contour of the tree. This pendant or droop-

ing character depends, however, greatly on the habit of the individual, as it is carried to a much greater extent in some trees than in others, although they may be similarly situated, both as to soil and situation. The trunk is covered with a thin bark, of a reddish colour and scaly surface, with occasional warts or small excrescences distributed over its surface; and the roots, which spread on all sides of the tree, run horizontally near the surface of the ground, and are so superficial, as to be partly exposed to view for some distance from the bottom of the trunk.

The leaves are scarcely an inch long, of a deep grass-green, straight, stiff, and sharp-pointed, and disposed around the shoots, though more crowded laterally, than on the upper and under sides of the branches. The male flowers, or catkins, about an inch long, are cylindrical, on long peduncles, curved, of a yellowish colour with red tips, and discharging, when expanded, a profusion of yellow pollen. The cones are produced at the ends of the branches, appearing, at first, as small-pointed purplish red catkins; after impregnation they gradually assume the cone-like form and become pendant, changing first into a green, and, as they become matured, into a reddish brown, acquiring a length of from five to seven inches, and a breadth of about two inches. The seeds, which are small and furnished with large membranous wings, are not shed or voided from the cones till the spring of the second year. The young plant appears with from seven to nine cotyledons, but makes little progress till after the third year, when it begins to put out lateral branches. Its progress from this time, till it reaches its fifth or sixth year, is at the annual rate of about six inches, after which age, if planted in a favourable soil, its average annual growth

is very rapid, the leading shoot being frequently from two to three feet in length, and this increase it continues to support with undiminished vigour for forty or fifty years, many trees within that period attaining a height of from sixty to eighty feet. Its growth after this period is slower, and the full extent or duration of the tree is considered to range between one hundred and one hundred and fifty years, though many, no doubt, attain a greater age before decay and death ensue. In full-grown trees the trunk sometimes acquires a diameter of five or six feet; but it may be stated generally, that it is a tree of more slender growth, in proportion to its height, than the Silver Fir.

Though a native of northern countries and found in similar parallels of latitude, the Spruce Fir is not considered indigenous to Britain, as no remains of ancient forests of this species are recorded as having existed in any of the mountainous districts of this island, nor have its remains been recognized amongst the other trees deposited in the peat mosses, beneath whose surfaces the Common Pine is so frequently and profusely met with. Its introduction, however, must have taken place at an early period, as it is mentioned by some of our earliest writers upon arboriculture. Turner, who published his work, entitled "Names of Herbes," in 1548, includes it in his list; Gerard, also, and Parkinson, figure and speak of it in their works.

Upon continental Europe it occupies a surface, in some of the more northern countries, scarcely inferior to that covered by the forests of the Common Pine. Thus in Norway, Sweden, Denmark, and Lapland it is the prevailing species upon all the moister description of soil, extending as high as 69° and 70° north latitude. It grows in the south of Norway at an elevation of three thousand feet above the level of the sea, and on the Lapland mountains as high

as one thousand feet, showing it to be a tree of a hardier constitution than the *Pinus sylvestris*, and capable of growing in a more elevated zone. It is also common in the north of Germany, on the Alps of Switzerland, the Tyrol, &c., and extends to Siberia and the north of Russia, even within the arctic circle, and is also indigenous on the mountains of the north of Asia. In all these different localities it affects a moister and softer description of soil than the *Pinus sylvestris*, growing most luxuriantly in what may be called springy ground, such as is frequently met with on the declivities of hilly regions or in the deep valleys and rocky glens which intersect and abound in districts of this description. In England, though its introduction may be traced to a distant period, few attempts to cultivate it upon an extensive scale, or in great masses like the Scotch Pine, appear to have been made, its use having mostly been restricted to that of an ornamental, or expected ornamental, appendage to parks and pleasure-ground scenery, as an evergreen. This effect, however, it is but ill calculated to produce throughout the greater portion of the champaign and southern parts of England, where neither the soil nor climate suits its nature, and where, to those who have seen its luxuriant growth and rich green colour, when growing in localities suited to its habit, so far from being ornamental, it invariably presents a sickly aspect and unsightly appearance. It is, therefore, a matter of surprise that it should still continue to be a principal ingredient in all the pleasure-grounds, whether large or small, in the vicinity of London, as well as in Kent, Sussex, and other districts, to the exclusion of other evergreens much more appropriate to the situation, and where, from the nature of the soil and climate it can never attain a healthy or imposing developement, a clayey

tenacious soil being no less unsuitable, than a chalky stratum, to its free and vigorous growth. Advancing northwards, and in soils suitable to its nature, the Spruce increases in the vigour and beauty of its growth. In Yorkshire, at Studley, Loudon mentions a Spruce which, at the time his valuable work was published, measured one hundred and thirty-two feet in height, and was supposed to be the largest and loftiest in England; the diameter of its trunk near the ground was then between six and seven feet, and it was regularly clothed with branches from the base to the summit. At this time it is supposed to be about one hundred years old, as it is said to have been planted by Eugene Aram towards the middle of the last century. Further to the north, and in Scotland, it delights in the moister soils of upland districts, more particularly in those deep ravines and narrow valleys which diversify the romantic scenery of the highlands. By the late Duke of Athol, distinguished as the greatest planter of his day, the Spruce was extensively cultivated and liberally introduced, wherever the soil and situation seemed favourable to its growth, as he considered it not only in the light of a nurse-plant, or secondary, in mixed plantations, but as a tree of national importance for the qualities of its timber, as it was satisfactorily proved that several of the older trees cut down upon his estate at Blair, and used as spars and topmasts, were equal in quality to those imported from Norway and the ports of the Baltic.

When grown for timber, and intended for poles, masts, spars, &c., it ought to be planted in thick masses, or in company with other trees, and allowed to be drawn up, or kept so close as to cause the gradual death of the lower tiers of branches before they become too large, or acquire

that gibbosity, at their junction with the trunk, which we see in large Spruce trees which have long retained them. These dead branches remain undecayed for a great many years, their wood being hard, matured, and of a red colour, and they may be knocked out, or cut off close by the stem, without any apprehension of the small portion remaining within the bark communicating decay to the trunk. In two or three years a deposit of new wood covers the parts previously occupied by the branch, and a clean bole, without knots or gibbosities, is thus obtained by the time the tree acquires a large scantling and becomes fit for felling.

As a nurse-plant, or intermediate occupant in mixed plantations, where the surface soil is light and suitable to its habit, the Spruce is one of the most eligible and profitable trees that can be grown, as it not only advances at a rapid rate, and produces wood of a more durable consistence than the Scotch Fir in its immatured state, but it is much better adapted, from its more regular and very pointed pyramidal form and the stiffness of its growth, to accompany, and be mixed with, deciduous trees, its arrowy or spire-like top not interfering, to any injurious extent, with the expansion of their more spreading heads, and allowing the full enjoyment of light and air, at the same time that the dense mass of foliage it carries beneath, supported by stiff unyielding branches, resists the influence, and softens the effects, of high and boisterous winds, thus preventing wind-waving, and other injurious effects to the trees in its immediate neighbourhood. Where shelter from prevailing winds, or the exclusion from view of particular objects is required, no tree is better adapted for these purposes than the Spruce, provided the soil is such as to suit its habit. In such cases, the principal object to be attended

to, is to see that the trees, as they advance in size, have sufficient room to allow of the full developement of the whole of their lower branches, as upon the retention of these its protecting qualities and use as a skreen entirely depend. It has, also, been treated successfully as a hedge-plant, in which form it affords good shelter in nursery or garden grounds. A fence of this kind is described by Mr. M'Nab, in the "Gardener's Magazine," as growing at the Whim, about fourteen miles from Edinburgh, every part of which, he remarks, is beautiful and green. When first made, the plants, about ten feet high, were put in at three feet apart, and cut down or headed to five feet; it was then cut or trimmed with the shears in the January of the following year, an operation since annually repeated in the same month, in order to keep it close and of a proper form. A figure of a portion of this hedge is given in the "Arboretum Britannicum," in which work Loudon also remarks, that hedges of Spruce are not unfrequent in Carpathia, Baden, and Bavaria, and that, in the neighbourhood of Moscow, they may be seen, in some gentlemen's grounds, trained to a height of thirty or forty feet.

In point of symmetry and regularity of form, the Spruce Fir, individually, is one of the finest of the *Abietinæ*, and, when in full and vigorous growth, must be acknowledged as forming in itself a beautiful object. Its pretensions, however, to rank as an ornamental or a picturesque tree in landscape scenery, depend upon concomitant circumstances, such as the propriety of the situation in which it is placed, and the effect it is calculated to produce, in contrast, or when grouped with other trees. Gilpin, though he could admire the Spruce individually for its feathery and floating foliage, allowed it little or no merit as an

ornamental or picturesque tree in landscape. This opinion, however, seems applicable to it only when planted in situations, or in districts foreign and unsuited to its natural habit, and where it can never be expected to attain either the dimensions or the form it bears in its native habitats, whether upon the Alps of Switzerland, or in the fir-clad regions of the north of Europe. Accordingly, we find Sir T. D. Lauder, in his valuable edition of Gilpin, expressing himself in the following terms, when speaking of the effect of the Spruce in its native regions: "The Spruce Fir is the great tree of the Alps, and, so far as our opinion of its effect in landscape may go, we can only say, that with us it is so mentally associated with the grandeur of Swiss scenery, that the sight of it never fails to touch cords in our bosom, which awaken the most pleasing recollections. What can be more sublime than to behold, opposed to the intensely blue ether, the glazed summits of Mont Blanc, or the Jungfrau, rising over the interminable forests of Spruce Firs which clothe the bases of the mountains, while some such gigantic specimens as those we have been noticing rise in groups among the rocks before us, many of them shivered, broken, and maimed by tempests, their dark forms opposed to all the brilliant prismatic hues of some immense, gorgeous glacier, which nourishes in its vast bosom a mighty river, that is doomed to fertilize and to enrich whole kingdoms!"

The timber of the Spruce is of excellent quality, being light, elastic, and durable, when grown in a soil, and in a climate, or at an elevation, suited to its nature. In colour it varies from a yellowish to a reddish white, and is less resinous than the wood of the *Pinus sylvestris*. The great height it frequently attains in proportion to its bulk, when growing in thick and crowded masses, renders it an

excellent material for the spars and masts of smaller vessels, as well as for scaffolding poles, ladders, &c., and for these purposes it is largely imported from Norway, in the form of entire trunks from thirty to sixty feet in length, but frequently with a diameter of not more than from six to eight inches at the root-end. Trees of larger scantling are sawn up into planks and deals, which are used for flooring and other interior joiner work. It is also much used by carvers and gilders, being of a fine and equal grain, and taking the tool in every direction, and, as it is a wood that glues well, it forms the lining of furniture, as well as that of musical instruments, &c.

Pontey, in his "Profitable Planter," speaks of the wood of the Spruce as being of good quality and durable, even at a young and immature age; from our own experience we find this to be the case, and that it is, even without any preparation, more durable than the Scotch Pine, at a similar age. Upon continental Europe, besides its valuable timber, various other products are obtained from it; among these, the resinous matter it exudes when wounded, and which, after undergoing a preparation by boiling in water, is known by the name of Burgundy pitch, is one of the chief, and is largely manufactured in the Vosges. Its bark is also used for tanning, and in Sweden and Norway the inner bark is made into light baskets, and the long fibrous roots are converted into a strong and durable kind of cordage, after being boiled in a ley of alkali and salt. In Norway, Laing, in his "Journal," informs us, that the deal floors of the houses are strewed over with the green tops of the Spruce or Juniper, at least once a week; these give out, when trodden on, a refreshing odour, which tends to overcome the close and unpleasant smell in rooms heated by stoves and

imperfectly ventilated. In this country, the twigs of the Spruce are often used to protect the blossom of wall-fruit trees, being inserted among the shoots of the latter previously to the expansion of the flowers, and allowed to remain till the spicula fall off and the fruit is well set; we have also found the branches excellent protectors, during winter, of half hardy shrubs and plants, either when growing against a wall or in the open borders, their close and thick foliage preventing the access and injurious effects of severe and long-continued frosts.

The propagation and culture of the Spruce in the nursery is similar to that of the *Pinus sylvestris*, the seeds procured from the long cylindrical cones being sown in fine, light, pulverized earth, so thick as to rise within a quarter of an inch of each other; here they must remain for two years, their growth being very slow; but on the third, when they begin to put out their first lateral branches, they may be taken from the seed-bed and run into nursery rows, from whence, after having stood for two or three years, they may be removed to where they are finally to remain, plants of this age succeeding better than those which have stood long, or attained a height of four or five feet in the nursery. As the roots of the young Spruce are numerous and much more fibrous than those of the Scotch Pine, they ought, unless of very small size, to be inserted by pitting, and not by the T or slit method, which might cramp and injure the delicate rootlets; and it should also be kept in mind, that success in planting depends much upon the weather, which is most propitious for this operation when mild and moist, and that the roots of the trees to be planted should remain as short a time as possible exposed to the air.

If grown for profit or as a timber tree, the Spruce, as

we have already observed, should be planted in thick masses by itself, or mixed with other trees; but where ornament is the object, and the full developement of its form is desired, it must, from the earliest age, be kept free from the contact of any other tree, and allowed scope for the full growth and elongation of its lateral branches, which, under such circumstances, become persistent during life, and upon whose retention the beauty and perfect cone-like form of the tree depends.

It seems subject to few diseases, but, from the resistance its thick close foliage and unyielding spray offer to the wind, is liable, upon light soils super-imposed upon a harder substratum, to be blown up by the roots, or even, in sudden gusts or hurricane-like storms, to have the trunk snapt right asunder at a less or greater distance from the root. The only insect which affects its health and growth in Britain is a species of aphis, whose attacks, however, seem almost confined to young trees under fifteen or twenty years old, but which, though injurious, we have never observed to prove fatal to the tree. The effect produced is easily observable in the pseudo cone-like excrescences which are so frequently seen upon the side shoots of young Spruce Firs, and which seem to originate in the following manner: in the autumn the parent aphis deposits her eggs at the base of the embryo leaves within the buds destined to produce the shoots of the following year; when these begin to burst and expand in spring, the leaves at whose bases the eggs have been deposited, instead of increasing in length, enlarge at the base and form a cell or cyst, whose mouth,



at first, is closed and protected by a red velvety-looking substance. If opened in this state, a nest of small greenish aphides is distinctly visible, and at a certain period, or when they have acquired maturity, which is towards the end of summer, the mouth of the cell opens, and the insects fly off to inflict a similar injury upon the nascent buds of the year. In some instances, the leaves of only a portion of the circumference of the shoot are affected, in which case, though a slight distortion may take place, the branch is not prevented from elongating; but in others, where the whole of the leaves around the shoot are converted into nidi, elongation is prevented and distortion to a great extent takes place. It is worthy of remark, that the leading shoot is rarely, if ever, affected, the attack being confined to the buds of the lateral branches.

At Twizell, about forty years planted, it is sixty feet high, the circumference of the trunk, at three feet from the ground, six feet six inches; and thirty years planted is about fifty feet high, circumference, at one foot above the ground, five feet two inches.

Before closing the account of the *Abies excelsa*, we may remark, that two species of the genus *Abies* have been introduced from North America, and cultivated as ornamental trees for the last fifty or sixty years; these are the *Abies alba* and *Abies nigra*, the White and the Black Spruces, so called from the colour of their respective foliage. Both of these are of inferior growth to the Common Spruce, with a close thick foliage and narrow cone-like forms. From the shoots of the *Abies nigra* is obtained the essence or extract of Spruce used in England in the making of Spruce beer, for which purpose the shoots themselves are used in America. Like *Abies excelsa*, the extremities of the lower branches of *Abies nigra*, when they touch the

ground, readily take root, and Loudon instances a tree at Sion, which is surrounded by a double circle of young trees, which have sprung from the ends of the lower side branches of the original plant, and another is described by Mr. Gorrie, in the "Magazine of Natural History," as growing in the woods of Braco Castle, Perthshire, surrounded by a similar offspring.

In America, the wood of the *Abies nigra* is esteemed for its strength, elasticity, and lightness, and is much used for spars, small masts, &c.

The Hemlock Spruce, *Abies Canadensis*, is a third North American species, first introduced about a century ago, but whose cultivation in Britain has been limited to mere ornamental purposes. In elegance of growth it surpasses either of the two above-named, the branches being symmetrically disposed and drooping gracefully at their extremities, the foliage light, and at the same time tufted and effective. Fine specimens of the Hemlock Spruce are by no means common in any part of Britain, and it seems a species very fastidious, both as to soil and situation. At Woburn there are some fine examples, also at Strathfieldsay, Claremont, &c.

Amongst the species recently introduced the *Abies Douglasii* promises to be worthy of an extended cultivation, not only as an ornamental, but as a timber tree, since it exhibits a rapidity of growth and hardiness of constitution equal to the Common Spruce, and may be expected, in this climate, to attain dimensions sufficient for every useful purpose, though perhaps far inferior to those enormous specimens seen by Douglas in the regions of which it is a native. It was discovered, in 1797, in Nootka Sound, by Menzies, who accompanied Captain Vancouver on his voyage round the world, and afterwards

by Douglas, in 1825, who found it growing in immense forests in north-west America, between 43° and 52° north latitude. Within these limits trees of ten feet in diameter, and from one hundred to one hundred and eighty feet



high, were observed, and he mentions the stump of one upon the river Columbia, which, exclusive of the bark, at three feet from the ground, was of the enormous girth of forty feet. The same traveller speaks of the wood as being firm, heavy, with few knots, of a yellow colour, and not in the least liable to warp. Our figure is from a fine thriving

young tree at Jardine Hall, Dumfriesshire, the seat of Sir William Jardine, Bart., which was planted as a seedling about fourteen years ago. It is now twenty-five feet high, the diameter of the circle covered by the lower branches fourteen feet. The girth of the stem at one foot from the ground is two feet nine inches. In one year the growth of the leading shoot measured as much as four feet, and the general average of its yearly shoot has been about two feet six inches. It is planted on a light and somewhat gravelly loam, which also seems to suit the *Pinus cembra* and *excelsa* from the Himalayas. At Hedgely, Northumberland, the seat of Ralph Carr, Esq., is another fine specimen, about the same age as that at Jardine Hall. This plant measured, in July last, twenty-eight feet in height, the circumference of the bole, at six inches above the ground, three feet, at eighteen inches, two feet one inch and a half, and the diameter of the circle covered by the branches twenty feet. This tree is planted in a moist clayey loam, which seems of too rich a quality for the nature of the tree, as the shoots of the two last years are inclined to monstrosity, being somewhat crooked, and fan-shaped or flattened. During the last year, it produced, for the first time, a large crop of its handsome cones, but, out of two or three dozen which we received, not a single perfect seed was extracted. The bark of this tree, as well as of that at Jardine Hall, is roughened by numerous cysts, filled with a clear and very fragrant turpentine. At Whitfield, Northumberland, the seat of Wil-



liam Orde, Esq., M.P., there is another specimen of *Abies Douglasii*, of dimensions, we believe, even superior to the two above-mentioned. It may be propagated by cuttings, which, if made of terminal or leading shoots, may be expected to form good trees, but, as specimens are now beginning to bear cones, seedlings are likely to become plentiful in a few years.

The *Abies Cephalonica* promises, also, to be a great acquisition to the list of our ornamental, and probably of our useful coniferæ. It was first, very recently, introduced by General Charles James Napier, from Cephalonia, of which Island it is a native, and to which, indeed, the species seems to be confined, its habitat being a ridge of mountains, the highest point of which was anciently called Enos, but now known by the name of the Black Mountain, where it occupies a zone between four and five thousand feet above the level of the sea. It differs from all the other European Firs in the form of its leaves, which approach in shape those of the *Araucarias*, to which genus, indeed, it bears a strong resemblance, and is probably the connecting link between it and the firs.

Its timber is stated to be of excellent quality, being very hard and durable, and an instance is cited by Loudon, on General Napier's authority, where the wood of *Abies Cephalonica* was found perfectly sound and as hard as oak in some old houses in the town of Agrostoli, which had been built from one hundred and fifty to three hundred years. It is still a rare tree in Britain, and plants are dear, but we may hope that exertions will be used by our nurserymen to obtain a supply of seed whenever opportunity offers.



Genus *Picea*. DON.

LINN. *Syst. Monœcia Monadelphia.*

Picea pectinata. DON.

THE SILVER FIR.

Picea pectinata,	DON in LAMB. Pin. b. iii.
	LOUDON's Arb. Brit. ch. cxiii. p. 2329.
Pinus picea,	LINN. sp. pl. 1420.
	AIT. Hort. Kew. iii. p. 370.
Abies pectinata,	Nov. du Hamel. v. p. 294.

The trees belonging to this section or genus of the *Abietinæ*, of which the Silver Fir is considered the type, are distinguished from the Spruce Firs, or genus *Abies*, by their leaves being distributed more decidedly in two rows upon the branches, by their cones being upright and having the scales deciduous, and by the irregular form of their seeds. In other respects, as to growth and form, they greatly resemble each other, their heads being as regularly pyramidal, or cone-shaped, during their life as those of the Spruces. The general aspect of the Silver Fir is, however, stiffer and more formal than that of the Spruce, in consequence of the branches, which grow in regular candelabrum-like whorls, being at right angles, and standing out more horizontally in reference to the trunk, a disposition which also extends to all the smaller branches and spray.

In dimensions and nobleness of appearance the Silver Fir is one of the most striking of the *Abietinæ*, rising frequently to the height of one hundred and sixty or even one hundred and eighty feet, with a stem perfectly erect, and generally clothed from the base to the summit with regular tiers of horizontal branches, and when at maturity frequently measuring as much as six or eight feet in diameter. For many years the bark is smooth and of a green grey colour, but as the tree gains age it becomes rough, with chaps or small fissures; and, when very old and verging to decay, often throws off the exterior part in large flakes, leaving the newly-exposed cuticle of a deep rich brown.

A peculiar effect is produced by the colour of the leaves, which are of a deep green above, while underneath they are variegated with two silvery white lines, which run lengthwise on each side of the midrib; they are from

half an inch to an inch long, slightly turned up at the points, which increases the effect of the silvery lines, and are disposed in two rows along the branchlets, a disposition, however, that is more distinctly marked in young than in old trees.

The cones are cylindrical and large, being from six to eight inches long, and stand erect upon the branches; when young they are green, but, as they advance towards maturity, acquire a rich purplish colour, and when quite ripe are of a deep brown; they remain upwards of a year upon the tree, as they first appear in May, when they blossom, and do not ripen the seed till the October of the following year. The scales are large, with a long dorsal bractea, and fall from the axil or spindle of the cone in the spring of the second year. The seeds are irregular and angular in shape, with a large membranaceous wing, wider above than below.

The roots, though horizontally disposed and spreading to a great distance around the tree, are not so superficial as those of the Spruce, but run at a greater depth, and are seldom exposed to view like the main roots of that species. The seedling plant rises with five or six cotyledons, and its growth for the first six or eight years is very slow. When three years old, it is not more than as many inches in height, and at this age it makes its first lateral bud or side branch, an additional one is added for the next two or three years, or till the usual whorl of four or five is perfected. At five years old plants are seldom more than a foot high, but after this the leading shoot begins to lengthen, which it continues to do annually, till the tree is about twenty years old, at which time it often makes a shoot of three feet in length; after this period the growth is not quite so rapid, and diminishes

gradually till the tree has attained its utmost limit of growth, which may be stated to be near two hundred years, though some individuals live much longer.

The introduction of the Silver Fir into England is supposed to have taken place about the commencement of the seventeenth century, as it is noticed both by Plot and Ray; Evelyn also speaks of two Silver Firs growing in Harefield Park, Middlesex, that were planted there in 1603, when seedlings of two years old; and he also recommends it for its beauty, and adaptation for the embellishment of avenues and public walks. Since that period, it has generally been introduced, to a greater or less extent, in ornamental plantations, and in some few instances has been more largely planted with a view to profit, but not upon that extensive scale it appears to merit, taking the excellent quality of its timber and the large scantling it attains into account, in both of which respects it is equal, if not superior to the Spruce, or even the Scotch Pine; it has also the advantage of thriving upon soils where the Spruce would never attain a timber-like size.

It is indigenous to all the mountainous districts of central Europe, being found in those of France, Spain, Italy, Switzerland, Germany, and Greece, inhabiting a zone immediately below that of the *Pinus sylvestris*. In these its native habitats it frequently attains enormous dimensions, trees of from sixteen to twenty feet in circumference at five or six feet from the ground, and from one hundred to one hundred and sixty feet high, being by no means uncommon. It is also a native of the west and north of Asia, but in Siberia and the Caucasus seems to be represented by the *Picea pichta*, which by many is not considered a distinct species, but only a variety of *Picea pectinata*.

The timber of the Silver Fir in this country, at least such as has been allowed to attain age or maturity, is found to be of excellent quality, and adapted for almost all purposes to which the wood of the Pine is applicable; it possesses both elasticity and strength; its grain being straight and even, it is not subject to warp or twist, even when sawn out of the green or new-cut log. Upon the continent, the forests of the Silver Fir, besides affording a large supply of naval timber for masts, yards, &c., produce much of the wood used in building, and in every description of carpentry and joinery; and, as it is found to endure a long time when driven as piles under water, it is extensively used for that purpose in Holland and other places. Other products of considerable value are also obtained from it; among these is the resinous fluid found in the small tumours beneath the outer bark, and known by the name of Strasburgh turpentine, a large quantity being collected from the forest of the Silver Fir near that town, by opening the cysts and securing the included liquid turpentine. The bark is also used in some parts of Switzerland for tanning, and the charcoal it produces, though inferior to that of the beech in evolving heat, is preferred for the forging of iron, as it renders that metal more pliant and more easily worked, in consequence of its producing its heat more slowly.

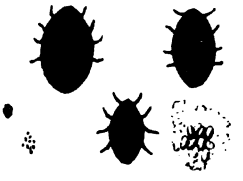
As an ornamental tree, it has the advantage over the Spruce Fir of growing to a greater size and attaining a more lofty height, and the more important one of growing upon a variety of soils where the other would never reach a timber-like size, or wear a healthy aspect; thus the Silver Fir thrives and advances to large dimensions upon tenacious or stiff clays, as well as upon loams of a richer description. It is, however, in our opinion, inferior to the

Spruce in the general outline of its form, the feathery effect of the waving contour of the branches and spray of that tree being more pleasing to the eye than the stiff and horizontally-disposed branches of the Silver Fir. Gilpin remarks, "the Silver Fir has very little to boast in point of picturesque beauty. It has all the regularity of the Spruce, but without its floating foliage. There is a sort of harsh, stiff, unbending formality in the stem, the branches, and the whole economy of the tree, which makes it disagreeable. We rarely see it, even in its happiest state, assume a picturesque shape." In this opinion Sir T. D. Lauder does not entirely coincide, for in his remarks upon Gilpin's text, he says, "As to the picturesque effect of this tree, we have seen many of them throw out branches from near the very root, that twined and swept away from them in so bold a manner, as to give them, in a very great degree, that character which is most capable of engaging the interest of the artist."

The variety of soils upon which the Silver Fir will thrive, and produce large and profitable timber, the hardiness of its constitution, which is such as to allow of its being planted in any part of England or Scotland, except the highest mountain elevations, (as it naturally grows in a zone next in altitude to that of the *Pinus sylvestris*,) are circumstances strongly in favour of its cultivation with a view to profit upon a more extended scale than it has hitherto received. To this, however, there exists at present one serious objection, which, if not remedied either by natural or artificial means, is likely to deter the planter from appropriating any considerable proportion of woodland to its growth: we allude to the liability of this species to the attack of an insect belonging to the family of the *Coccidæ*, and genus *Eriosoma*, which not only injures the

health of the individual it infests, by disfiguring and destroying the leading shoots, but very frequently causes the actual death of the tree by the absorption of its juices, which constitute the food of these small but destructive beings.

This pest, so fatal to the Silver Fir, appears to have been greatly on the increase, and to have spread widely and generally throughout every district of the kingdom, wherever that tree has been introduced, within the last twenty or thirty years, for we do not find that its ravages had been noticed, or at least that trees of this species had suffered to any injurious extent, previously to this period. This *Eriosoma*, unlike many of the *Aphides* and *Coccidæ* found upon various species of the *Abietinæ*, never attacks the leaves of the tree, but is always confined to the main stem, and the under sides of the branches; upon these parts it appears when first seen, or at least when first distinctly visible to the naked eye, in minute patches of a pure white, which, when closely inspected, are seen externally to be of a flocculent or cottony substance. On removing this covering, which is an exudation from the body of the insect, the creature itself and numerous bunches of eggs become visible, as represented in our magnified figures.



These creatures, by the extraordinary mode of propagation common to the members of the family to which they belong, increase with a rapidity it is scarcely possible to imagine: and in a very short time, where at first a few scattered individuals only were to be seen, the entire surface of the bole

of the tree, from the root to the summit, becomes as it were encased by a mass of living matter, each individual of the countless multitude being engaged in extracting the circulating fluids of the tree by means of a sharp hair-like proboscis which penetrates the exterior bark. In this state the tree appears as if covered or dusted entirely over with a white mealy substance, which, as already observed, exudes from the skin of the insect, and probably answers as a defence against rain and cold, or a protection against its enemies. After an attack such as we have described, and which generally lasts for two or three years, the tree is either left in a dying state, or with a considerable portion of the top destroyed, an unhealthy-looking yellow foliage, and a thickened diseased bark, and these effects, we may observe, are not confined to plants of a small size or tender age, but are equally severe upon full-grown trees of stately dimensions.

Hitherto no effectual remedy has been discovered, either to prevent the attack or put a stop to the increase and destructive effects of this pernicious insect; for although there are certain liquids, such as lime-water, infusion of tobacco, &c., which prove fatal when they reach the naked body of the *Eriosoma*, their application is rendered comparatively unavailing by the nature of the cottony substance that envelopes them, which effectually repels the admission of the liquid to the skin of the insect; the cost and labour of such applications upon an extensive scale where numbers of trees are affected, as well as the impossibility of reaching every part of an infected tree, also render such remedies almost nugatory, or necessarily confined to a very few cases.

At Twizell, where the Silver Fir has been liberally introduced, a few trees, which, from their situation it was

desirable should be preserved at any cost, have been saved whenever attacked, by the same process as that resorted to by Sir T. D. Lauder, viz., scrubbing the boles and branches of the trees with a brush, or what is as effectual, with wisps of coarse grass or hay; the labour and expense attending such a remedy it is evident must necessarily restrict its application to very narrow limits, and could scarcely be resorted to where the tree is planted in mass or with a view to profit. Trees in the highest health and growing luxuriantly, seem to be attacked as freely, or perhaps even more so, than those advancing at a slower rate, and we are inclined to think that those growing in a rich soil are sooner infected, and to a greater extent, than such as are planted upon one of inferior quality. In the immediate vicinity of the house at Twizell, where the ground is good, the insect has proved very destructive, and few trees have escaped an attack; but in some outer plantations, where the soil is inferior, having the surface mould of a blackish moory quality, with a clayey substratum, the Silver Firs, though strong, vigorous, and in good health, and now twenty feet high, have hitherto remained untouched. In many parts of Scotland some of the finest specimens have been killed by it. Sir T. D. Lauder remarks that this has been the case with most of the trees at Relugas and Ballindallock, in Morayshire, and also at Cullenhouse, Banffshire. In Dumfriesshire we have seen the sad havoc it has committed, and in many parts of the north of England it is proving equally fatal to the species. This insect seems limited to the Silver Fir, as we have not recognized it upon any other of the *Abietinæ*. The young shoots of the Silver Fir are also frequently infested with an aphis, but its attacks seldom do any serious injury to the tree.

In England, the Silver Fir, under advantageous circumstances, attains a magnificent size, many trees, already recorded by Loudon and others, having reached a height of from one hundred to one hundred and thirty feet, with trunks of a diameter varying from three to upwards of six feet, and containing from two to upwards of three hundred feet of solid timber. In Scotland, also, it has reached dimensions equally great. At Roseneath Castle, Argyleshire, there are several magnificent Silver Firs. Among them one upwards of one hundred and twenty-five feet high, with a trunk whose diameter, at six feet from the ground, is nearly seven feet; another upwards of one hundred and twenty feet high, and a third remarkable for its form as well as size, a figure of which was published by Mr. Strutt. There are also many trees in other parts of Scotland of nearly equal dimensions, and among those not already recorded, we may mention fifteen trees growing on two sides of a small triangle at the Heuk Dumfriesshire, and planted between seventy and eighty years, two of which measure upwards of nine feet in girth, and the remainder from six to seven and a half feet; another fine specimen in the same county, at Rammerscales, which measures thirteen feet one inch at fifteen inches from the ground; and at Arbigland are trees of upwards of thirteen feet in girth, besides the stocks of two which were blown down in the hurricane of January 1838, one of which shows a circumference of fourteen feet nine inches, exclusive of the bark, and the other of thirteen feet six inches. In Northumberland, at Hartburn, there are two noble Firs of this species, planted about eighty-seven years ago; one of these is nearly one hundred and forty feet high, the diameter of the trunk upwards of four feet; the other is about one hundred feet high. At

Howick, it is eight feet in circumference at two feet from the ground; at Fallowden are two trees, each upwards of nine feet eight inches in circumference at two feet from the ground, and about eighty feet high. At Twizell, about thirty years planted, there are several trees from four to upwards of five feet in girth at two feet from the ground, and upwards of fifty feet high.

The cones should be gathered in October or November, and the seeds separated from them in the following March, by exposure to the sun; these should be sown in well-pulverized beds at such a distance as to allow the plants to rise about one inch apart. After remaining two years in the seed-bed, they should be run into nursery rows, from whence they may be removed in other two years to permanent stations, or again transplanted in the nursery at greater distances, and removed as occasion may require.

To the same genus belongs the *Picea balsaminea*, Balm of Gilead Fir, which bears a considerable resemblance, when young, to the Silver Fir, in its form and foliage. It is a native of North America, from whence it was introduced about the middle of the seventeenth century; but as it is a species whose duration seldom extends beyond twenty years, whose height is limited to twenty or thirty feet, and whose wood is of little or no value, we cannot recommend its cultivation, either as a timber or an ornamental tree. It produces great crops of cones, when fifteen or sixteen years old, of a deep purple colour, the appearance of which generally indicates the speedy decay and death of the tree.

The Bark is thickly covered with small tumours, which on being opened, are found to contain a clear and limpid resinous fluid, which in America is collected and sold under the name of Balm of Gilead, or Canada Balsam.

In order to prevent mistakes from the general resemblance which the young of this and of the Silver Fir bear to each other, we may mention, that the two species are readily distinguished by the form and appearance of their terminal buds, those of the Balm Fir being rounded, very smooth, and entirely covered with a dark shining varnish, whereas those of the Silver Fir are of a light brown, more pointed, and covered with a chaffy substance.



Of the species belonging to this section recently introduced, there are several which it is probable may thrive in our climate,—such are *Pinus amabilis* and *Pinus nobilis* of Douglas, natives of the north-west of America; *Pinus Webbiana* of Wallack, and *Pinus Pindrow*, natives of the mountains of Nepal, and magnificent trees in their own country, are also likely to succeed.



OLD SCOTCH FIR.



Genus *Larix*, TOURN.

LINN. *Syst. Monœcia Monodelphia.*

Larix Europœa. DECAN.

THE COMMON LARCH.

Larix Europœa,

Pinus Larix,

DECAN. Flor. Fran. No. 2064.
LOUDON's Arb. Brit. ch. cxiii. p. 2350
LINN. Syl. pl. 1420.
HUNTER's Evel. Sylv. p. 269.
AIT. Hort. Kew. p. 369.
LAMB. Pen. t. 48.

The members of the genus *Larix* are distinguished from the rest of the *Abietinæ* by being deciduous, that is, they lose their leaves in the autumn of the same year in which they are produced, instead of retaining them for one or more years, as is the case with all the Pines and Firs belonging to the genera *Pinus*, *Abies*, and *Picea*. The species, botanically speaking, generally admitted as distinct, are not more than three or four; viz., the *Larix Europæa*, which inhabits the mountainous regions of Europe, the *Larix Siberica*, which probably may only be a variety of *Larix Europæa*, found in Russia, Siberia, and Northern Asia, and *Larix pendula*, and *Larix rubra*, natives of North America.

Of these different kinds, the *Larix Europæa* far surpasses the rest in the dimensions it attains, at the same time that its timber possesses, in the highest degree, that durability and excellence which characterize all the trees of this genus.

The European, or Common Larch, whose cultivation in Scotland and the north of England, within the last sixty years, has far surpassed that of any other tree, and in a great measure superseded the planting of the Scotch Pine, and whose valuable properties as a timber tree, applicable to almost every purpose in naval, as well as civil architecture, are only beginning to be duly appreciated, is a native of several of the mountainous regions of Europe. On the Alps of France and Switzerland it is extensively distributed, occupying the chasms and gullies of the mountain slopes to a height of five thousand feet above the level of the sea, and it has been observed to give a preference to a northern, over a southern exposure; this De Candolle supposes to arise from the irregularity of the spring in these Alpine localities, where frequently a too

precocious bursting of the buds of the Larch takes place on the southern declivities, and they consequently suffer, or are killed, by the frost. In Italy it inhabits the Apennines; in Germany it is particularly abundant in the Tyrol, and other mountainous districts, and extends eastward into Hungary. It is, however, wanting on the chain of the Pyrenees, nor do the northern kingdoms of Norway, Sweden, &c., prolific as they are in species of the evergreen *Coniferæ*, produce the Larch.

In its native habitats, like many of the *Abietinæ*, it grows most luxuriantly, and reaches its greatest dimensions in soils composed of the débris of, or incumbent upon, the older or primary rocks, such as granite, gneiss, mica slate, &c.; rocks of a calcareous nature are also very favourable to its growth. Mountain slopes, or the steep and shelving sides of glens and narrow valleys, are most congenial to its habit, for on these its roots are kept cool and constantly refreshed by the regular percolation of moisture, without ever being subjected to drought, and it receives that constant nourishment indispensable to its perfect developement. It is also in such localities, where, from the eddies and currents created by the varied surface, the wind can seldom blow for any length of time in one direction, that it is much less liable to be affected by its action, or to have its growth impeded, than when planted in a plain and open country, where the full effect of prevalent winds are severely felt, and the trees show its power, not only in their diminished stature, but in their greater or less deviation from an upright growth.

In form, the Larch, like most of the *Abietinæ*, rises with a conical or pyramidal head; the branches, which are subverticillate and small in comparison to the size of the trunk, spring horizontally from it, but in old trees

they frequently take a partially pendent direction, and the branches are also more or less pendulous according to the habit of the individual. The male and female



catkins appear in April, the former being sessile upon the branchlets, of a globular shape and yellow colour; the young cones are of a beautiful, rosy red, varying in some to a reddish, in others, to a yellowish, white, but as they ripen they change to a wood brown; they stand erect upon a strong bent footstalk, and when fullgrown are upwards of an inch in length; the scales are striated and persistent, round, and slightly waved on the margin. The seed is of an ovate shape, and half surrounded by the broad membranaceous wing, or pericarp. The young plant rises with from five to seven cotyledons.



In favourable situations, and in its native habitats in Alpine regions, it grows to a height of from eighty to upwards of one hundred feet, with a diameter of trunk of from three to five feet. Trees of dimensions equal to

the above are now by no means rare, either in Scotland or in parts of England, though the introduction of the species took place not much more than a century ago.

At Dunkeld, two of the original trees introduced from the continent, which are still in a thriving and healthy state, as well as many of their progeny, both around Dunkeld and at Blair Athol, are of these proportions. Such are those also at Dalwick, in Peebleshire, the seat of Sir J. M. Nasmyth, Bart., which are said to have been planted in 1725, and if so, must be considered the oldest Larches in Scotland, portraits of two of which, viz., the *crooked* and the *tall* Larch, are given in Loudon's "Arboretum." At Monzie, in Argyleshire, also, the Larches planted in 1738 are well known for their great size and height, and the amount of cubical timber they contain, and, indeed, upon almost all properties of any extent, Larches are now to be met with of large and valuable dimensions. The Larch, unlike the Spruce and Silver Firs, whose increase for the first seven or eight years is very slow, is of rapid growth, even from an early age, and in favourable situations it usually attains a height of from fifteen to twenty feet within twelve years from the seed, and at fifty years old is often eighty feet high. At Twizell, growing upon a calcareous soil, and in the favourable locality of a deep dene, there are several Larches, not forty-five



years planted, from sixty to seventy feet high; among them one whose girth, at two feet from the ground, is five feet ten inches, and several others from four feet and a half to upwards of five feet.

In the climate of London, not, we believe, the most favourable to the Larch, Loudon states its rate of growth to be nearly as above, and also that the annual increase of the girth of the trunk in Scotland, where favourably situated, is at the rate of from one inch to one and a half for the first forty or fifty years, taken at six feet from the ground. After this age, it begins to decrease, and at seventy and eighty years old, the average annual increase does not exceed half an inch.

The Larch was well known to the Romans, and held in high esteem for the valuable properties of its timber; Pliny frequently mentions it, and speaks of its incorruptible nature, different from that of the Pines, and also of the difficulty with which it is set on fire, remarking that it never flames, but burns more like a stone than wood. Vitruvius, speaking of the Larch, attributes the insufficiency and early decay of the buildings at Rome, erected in his day, principally to the want of Larch wood, which could no longer be procured within a reasonable distance of that city, the forests which previously afforded it having become exhausted; like Pliny, he also speaks of its incorruptible, as well as its incombustible nature, epithets which must be taken in a limited sense, though Cæsar, in his Commentaries, designates this tree not only as "*robusta Larix*," but also "*igni impenetrabile lignum.*" In later times it has fully retained the reputation it acquired in earlier ages, for we find, that, in all countries where it is native, or where its timber can readily be procured, it has always been preferred for the timbering

of the most important works, especially where strength and durability are required.

In England, though it may be traced for nearly two hundred years, it was not till within the last fifty or sixty that it came to be treated as a timber tree, having previously been considered in the light of a rare exotic ornamental appendage to the garden. Parkinson, in his "Paradisus," published in 1629, the first author who mentions the Larch as growing in England, speaks of it as "rare, and nursed up with a few, and those only lovers of variety." Evelyn, thirty-five years afterwards, in his "Sylva," mentions a Larch of goodly stature, growing at Chelmsford in Essex, but it evidently was a tree of rare occurrence at the time he wrote. About sixty years posterior to this date, we find Miller, in his "Dictionary," published in 1731, remarking, that "this tree is now pretty common in English gardens," and in the edition of 1759, he again speaks of it as then plentiful in most of the nurseries in England, and that "of late years great numbers of trees had been transplanted." This latter date, we may observe, was posterior to its introduction into Scotland, which, according to some accounts, took place in 1725, when the trees previously mentioned are said to have been planted at Dalwick; others, and amongst them the late Dr. Walker, assert that the first Larches brought into Scotland were those planted at Dunkeld, in 1727. The original plants, according to the popular account, were brought from Italy with some orange trees and other exotic plants, and for some time received a hot-house treatment, but being found to sicken under such a discipline, they were transplanted into the open garden, where they soon began to thrive and grow with the vigour natural to the tree.

It is from this fortunate incident, and the rapid progress of the plants when thus transplanted into the open ground, that we may date the commencement of that extensive cultivation of the Larch which has prevailed for the last sixty or seventy years, and which has given to the nation a species of timber, scarcely, if at all, inferior to the oak, even for naval architecture, and superior to any other wood we possess, for all purposes where strength and durability, under circumstances the most trying, are required. Upon investigating the circumstances attending its first introduction into Scotland, and referring to the account published in the eleventh volume of the "Transactions of the Highland Society," we find that, even during the life of James Duke of Athol, the planter of the first trees at Dunkeld, other Larches at different times to the number of upwards of nineteen hundred, were distributed by him in various situations at Blair and Dunkeld, as well for ornament, as to test its value as a timber tree, of which he became satisfied before his death by seeing the superiority of the wood of Larch not more than eighteen or twenty years old over that of the Common Pine of a much greater age. Upon the succession of his son, John Duke of Athol, the planting of the Larch was steadily pursued, and as extensively as the scarcity and dearness of Larch plants would then admit of, for as yet only a few of the first-planted trees had commenced bearing prolific seed, and plants in the nurseries were selling as high as sixpence each. In consequence of this deficient supply, the Larch, in the plantations then formed, were mingled with other trees, chiefly the Scotch Pine, in the small proportion of fifty to the acre, four thousand plants being then the usual allowance to this quantity of ground. This duke also first conceived the idea of planting the Larch

by itself as a forest tree, which he carried into execution on a small scale, by planting three acres with Larch alone, on Craigvinion near Dunkeld, at a higher elevation than those planted by his father, Duke James, upon the same hill in 1759.

At the decease of Duke John, which took place in 1774, eleven thousand four hundred Larches had been added to the nineteen hundred and forty-one planted by his father. The cultivation of the Larch was pursued by his son, John, the late Duke of Athol, who succeeded to the title and property in 1774, with an ardour and perseverance which not only place his name at the head of the list of extensive and successful planters, but entitle his memory to the respect and gratitude of his country as a public benefactor, inasmuch as his example, independent of the forests he himself created, has led to that extensive cultivation and dissemination of the Larch, which, in a few years, will go a great way to supply the kingdom with a description of timber much more valuable for all important purposes than any we can import, and which we may hope will hereafter render us in a great measure independent of that supply which we have now to look for from abroad.

For several years the operations of the Duke were necessarily restricted, by the difficulty of procuring a sufficient number of Larch plants; but as the deficiency gradually became lessened, in consequence of a constant succession of the earlier planted trees arriving at a cone-bearing age and the importation of seed from abroad, plantations upon a scale of gigantic magnitude were successively undertaken and finished, and we find that, at the period of the Duke's decease, which occurred in 1830, an area of nearly ten thousand acres had been planted with Larch alone, and that the aggregate number planted upon

the property at Blair and Dunkeld, from the time of its introduction, amounted to the enormous number of fourteen million ninety-six thousand seven hundred and nineteen plants, of which nearly thirteen millions were planted without mixture, the remainder having been dispersed in plantations of Pine, or in others of a mixed character.

At the time the late Duke succeeded to the title, the Larch, with the exception of the three experimental acres, as we may call them, planted by his father, had been mixed at distant intervals with Pines and other forest trees, and mostly in sheltered situations, and at a low elevation, or not more than five hundred feet above the level of the sea, as the tree was at first supposed to be of a more delicate constitution than the Scotch Pine, which was sometimes carried as high as nine hundred or one thousand feet up the mountain slopes. The more rapid growth as well as the hardier nature of the Larch did not, however, long escape the notice of the Duke, and he accordingly began to lessen the number of Pines, and increase that of the Larch, in his plantations, pushing at the same time the latter tree to higher elevations, where it was found to grow as vigorously as in the lower sites, and soon to outstrip the Pine, and become a tree where the latter remained a stunted bush. In the account contained in the "Highland Society's Transactions," already referred to, it is stated, that a plantation of Scotch Pines "planted at nine hundred feet above the level of the sea, had the vacancies occasioned by death or accidents filled up, ten years after, with Larch, as an experiment. In 1800, when the Duke was again anxious to extend his Larch plantations, the effect of this experiment confirmed him in an opinion he had previously conceived of the very hardy nature of the

Larch. These Scotch Pines, in a period of nearly forty years, had only attained a height of five or six feet, while the Larches, which had been planted among them ten years after, were from forty to fifty feet high." After so decisive a proof of the superiority and hardier constitution of the Larch, the Duke no longer hesitated in carrying his plantations, consisting entirely of this tree, to the summits of the hills, and he forthwith commenced those extensive operations which now clothe a wide extent of the mountainous district around Blair and Dunkeld with a forest of Larch.

Of the importance and prospective value of this forest some idea may be formed, from the calculation that at the age of seventy years it ought, as timber for naval purposes, to produce the enormous sum of six million five hundred thousand pounds sterling, and this exclusive of a return, during the above period, of seven pounds per acre for thinnings, after deducting all the original outlay of planting and other expenses. Further we may here remark, that the improvement of the pasturage beneath the Larch, produced by the fertilizing effects of the fallen and decayed spicula of this tree, and other causes, is such, that in the course of twenty-five or thirty years, it has been found, that land which previously to its being planted with Larch was covered with heath, and not worth one shilling an acre, at the end of that period, and after all the thinnings of Larch had been completed, was covered with a beautiful sward, worth from eight to ten shillings an acre, and forming an excellent pasturage for cattle and sheep. A conversion, in fact, of barren waste into a fertile and valuable soil.

While the Duke of Athol was thus engaged in extending the cultivation of the Larch, and clothing the

naked hills around Blair and Dunkeld with a valuable and luxuriant forest, its introduction had not been lost sight of or neglected by other Highland proprietors, for we find that towards the middle of the last century, a mixture of Larch had already been introduced in plantations of Scotch Pine, and was carried as far as the limited supply of plants would then permit, and this proportion continued to be increased, as the supply became more abundant, till at length by the close of the century, the Larch had, in a great measure, superseded the Pine, which previously had been the principal, indeed, almost the only, tree planted in those localities. At the same time its cultivation continued to progress rapidly throughout the Lowlands and the north of England, and it began to form a constituent in all mixed plantations; public attention having been particularly directed towards it, not only by the writings of Dr. Anderson, who, under the name of Agricola, had, about the year 1777, strongly recommended it as a valuable timber tree, but by the actual and convincing proof which the earlier planters of the tree now had of its great superiority over the other species of firs, in regard to the quality of its wood, in those instances where they had occasion to make use of the thinnings. Further trial only served to confirm the favourable impression of its value and applicability to various purposes, and it has ever since continued to be extensively cultivated, and to form a chief constituent in all plantations throughout Scotland, and in many parts of England, whether, as in the hilly districts, they be formed of one or two species only, as of the Larch and Scotch Pine, or in those where a variety of deciduous as well as evergreen species are introduced.

In the Highlands, when the Larch is planted with a mixture of Scotch Pine, which is still occasionally done

in certain situations, the proportion is generally five plants of Larch to one of Pine; in other plantations, and in the lower grounds, where a mixture of various species of deciduous trees with some of the *coniferæ* as nurses is usual, the proportion of Larch is generally from a third to a-half of the whole plants inserted; thus, when three thousand trees are planted to the acre, one thousand or fifteen hundred may be of Larch, the remainder consisting of oak, ash, &c., with Scotch and Spruce firs. In the formation of such plantations, we have already in our account of the oak, given the proportionate numbers and the various kinds deemed most suitable for soils of different descriptions, considering the oak, where the soil is favourable to its growth, as the ultimate object of the planter, or the tree calculated to remain as the final crop upon the ground. In these combinations the Larch will be found in the proportions above mentioned, viz., one third or one half of the whole, as it is considered, and has been proved to be, by far the most profitable intermediate occupant that can be selected, at the same time that it acts as a favourable nurse or protector to the oak. In some situations, and upon certain soils, we believe that all other trees might be advantageously omitted, planting nothing but the Larch and oak, the latter in such numbers only, and at such a distance from each other, as would suffice to ensure a regular crop of large timber, after the whole of the Larch had been taken away; thus upon an acre, five hundred oak plants, properly looked after, would be an ample stock to constitute a crop of timber, after the Larch, to the amount of two thousand five hundred, had been removed by repeated and judicious thinning. Some, indeed, object to the Larch as a nurse plant to the oak and other trees, under the idea that it does not, from its deciduous habit

and growth, afford sufficient shelter, or give that imaginary increase of warmth which the thicker and persistent foliage of the Scotch Pine and Spruce Fir are supposed to produce: in this opinion we cannot coincide, as experience has shown us that the oak and other hard-wood trees thrive as well, or perhaps better, under its fostering care, than under that of the evergreen Firs, and this we attribute in a great measure, to that very quality of the Larch which is objected to by its opponents, viz., its deciduous nature; for, even when deprived of its leaves during winter, it offers a resistance sufficient to break and ameliorate the effect of the winds, affording the degree of shelter required, and at the same time admitting of a freer circulation of air, which contributes essentially to the health and vigour of whatever trees it is meant to protect. Nor do we find that it is more injurious to its companions either by overtopping or more severely lashing them than the evergreen Firs; indeed, its pyramidal growth and the stiff nature of its stem prevent any excessive motion by the wind, and the smallness and delicacy of its spray, so far from committing equal injury, are much less destructive to its neighbours than those of stronger and stiffer growth; neither can we allow the force of the objection, that, by its more vigorous growth, it deprives the soil of what ought to go to the nourishment of the trees to be protected, till it be clearly shown that its roots require and draw from the soil precisely the same pabulum required by the other trees with which it may be associated,—a circumstance, we believe, by no means the case with many of our hard-wood species, and particularly in regard to the oak whose roots run much deeper than those of the Larch.

The wood of the Larch is not only remarkable for its durability at all ages, but for its strength and tough-

ness, as compared with that of the Pine and other Firs, arising from a different disposition of the woody fibres which are much more closely interwoven and more strongly connected with each other than in the firs, in most of which, indeed, but little lateral adhesion exists, as is evidently shown by the ease with which their timber may be riven into long straight fragments, whereas that of the Larch can be split only with great difficulty, and never in a straight direction. When dry and seasoned it is very light, the cubic foot not weighing more than thirty pounds and a half. The colour of the heart or matured wood is of a reddish brown, varying in depth according to the soil and situation in which it is grown, being of a darker red in cold and elevated regions than in a lower altitude and in a richer soil. The idea of the incombustibility of the wood of the Larch among the ancients, no doubt arose from the difficulty with which it is set on fire, and its liability to become extinguished if not closely attended to; it may, however, by proper management, be made to produce a strong fire; and the charcoal procured from it is not only heavy, but highly esteemed in the iron smelting furnaces abroad for the great heat it emits. Upon the Continent Larch wood is considered, in those countries which produce it, as superior to any other tree for all purposes where strength and durability under the most trying circumstances are required. Malesherbes remarks, "It is excellent for all purposes, and is in such request in several of the Swiss Cantons, that a piece of Larch wood costs double the price of a piece of oak of the same dimensions." It is also in extensive use with the carpenter and cabinet-maker; and the furniture made of it exceeds in beauty that of many highly-prized exotic woods. Larch panels, for painting on, were preferred to those of any other wood

by the ancient masters, for their unshrinking quality, toughness, and durability; and Gilpin remarks, "that many of Raphaël's pictures are painted on boards of Larch." In Germany casks are made of it which are almost indestructible, and which allow of no evaporation of the spirituous particles of the wine contained in them. In Switzerland it is much used for vine-props which are never taken up, and which Loudon remarks "see crop after crop of vines spring up, bear their fruit, and perish at their feet, without showing symptoms of decay." The uninjured state in which it remains when buried in the earth, or immersed in water, renders it an excellent material for water-pipes, to which purpose it is largely and invariably applied in many parts of France. The other products obtained from the Continental forests of Larch, are known by the names of Venice turpentine, and manna of Briançon. The former is procured by tapping the full-grown trees, which are known to be surcharged with turpentine by the exuding of resinous tears through the bark, when the sap begins to flow in spring; holes in a slanting direction upwards are then bored with an auger on the south side of the trunk, care being taken not to penetrate to the centre of the tree, and into these are inserted tubes, or wooden gutters, made of Larch wood, which conduct the limpid turpentine into small vessels or troughs, placed at the foot of the trees. The turpentine thus collected is afterwards strained through coarse hair-cloth, to free it from leaves and other accidental impurities that may have fallen into it, and then sent to market, without further preparation. The flow of the turpentine continues from May till September, when it ceases, and the holes are stopped up, and are again re-opened at the commencement of the next season; and it is said that a full-grown, healthy Larch, if tapped when of proper age,

will yield seven or eight pounds of turpentine every season for forty or fifty years in succession. The wood of trees, we may observe, from which the turpentine has been long extracted, is of no use for building purposes, and even the charcoal made from it is inferior to that made from the Larch undeprived of its resin. The manna of Briançon, so called from its being collected and produced in greater quantity in that country than in any other, is found in the form of small white glutinous grains, supposed by some to be an exudation from the bark of the young shoots, by others of the buds and leaves, though to us it seems more likely to be the product of an insect; in its appearance, and properties, it bears some resemblance to the manna of the flowering ash,—*Fraxinus ornus.*

In Britain, though the Larch as we have seen, was first planted with a view to profit, or as a timber-tree only about seventy or eighty years ago, the rapidity of its growth, and the quality of its wood, which was found, even when cut at a very early age, to be superior in every respect to that of the evergreen Firs, soon brought it into notice and use, and it is now, after further trial, universally considered and admitted to be not only the most profitable tree to plant, but to produce timber applicable to a greater variety of purposes, and possessing properties superior to those of the most valued deciduous forest trees, rivalling even the oak in its adaptation to the important purpose of ship-building, in which it is now largely employed. In Scotland and the north of England it is also daily coming into more extensive use, and is rapidly taking the place of other woods, such as those of the ash, and wych-elm, even in the manufacture of articles and implements for which the timber of these trees was previously considered almost indispensable, but which when

made of good sound Larch, are now found to be stronger, more durable, and at the same time lighter, than those made of the woods formerly employed.

Although the wood of the Larch had been used for various purposes, and its valuable qualities ascertained by the late Duke of Athol, previously to the publication of Pontey's "Forest Pruner," in 1805, that author has the merit of being the first who, from his own experience, treats of the value of British-grown Larch. In that work he contrasts the wood of this tree with that of foreign Fir, and states that he found it to excel the latter in many important particulars, the principal of which were its durability under trying circumstances, its toughness, which prevents it from cracking or splitting, even when sawn into thin boards, and its being much less liable to shrink, when once dried, than foreign deal.

During the period which elapsed between the publication of Pontey's work and Mr. Matthew's valuable "Treatise on Naval Timber," which appeared in 1831, and who is the next British author who treats of the Larch from his own experience, the wood of this tree had come largely into use, those trees first planted having now acquired a large scantling and maturity fitting them for important works; whilst the extensive plantations that had been and still continued to be made in almost every direction, afforded a constant succession and supply of thinnings applicable to a variety of minor purposes. But the most important trial to which the Larch was subjected during this period was its application to ship-building, upon its adaptation to which depended in a great measure much of its future value, not only to those who had planted it like the Duke of Athol upon an extensive scale, in the hope of its answering such a purpose, but to the kingdom

at large in a national point of view. Nor have the anticipations of the most sanguine been disappointed, the various ships which have been built of its timber having been found equal in many respects to those made of the best oak, and superior to them in others.

The first instance of British Larch having been used in ship-building is stated by Matthew to have taken place about 1809, in the Tay, where a sloop, in which the upper timbers had become decayed, was repaired with Larch; this vessel, it appears, about eighteen years afterwards, went to pieces upon the Fifeshire coast, and part of her remains having been washed ashore, the Larch with which she had been repaired was found as tough and sound as when first put into the vessel, "having assumed," as he observes, "the dark blue colour which some timbers acquire in moist situations, when it may be styled cured, and when it is no longer subject to the putrid change engendering dry-rot."

A few years afterwards, a fine brig, called the "Larch," was built by the Duke of Athol; and in 1816, the keel of the Athol, a frigate of twenty-eight guns, was laid down, and the vessel finished in 1820, being built entirely of Larch from the newly created forests of Blair and Dunkeld, and this vessel, we may add, has proved in every way, as to strength and durability, equal to one built of oak.

Among the properties possessed by the Larch, and which peculiarly fit it for naval architecture, is its toughness combined with its lightness, which, as Matthew observes, renders it superior to any other timber for the construction of bombs and war vessels; the effect of cannon-shot being only as it were to bore a hole like an auger, no splintering or splitting of the wood, generally more destructive to life than the shot itself, taking place, in consequence

of the netted structure and strong lateral adhesion of the fibres of the wood. In a ship the Larch seems to become harder and more durable by age; it also holds iron as firmly as oak, but without corroding it like that wood, the bolts of old Larch vessels having been driven out perfectly clean, and fit for further use; and as it does not shrink, it retains the oakum, and requires less frequent caulking than oak; this quality also, as well as that of resisting damp, makes it a valuable material for the decks and interior fitting of vessels.

For clinker-built boats, the Larch, in consequence of its strength and durability, wherever it has become known, has completely superseded the use of other fir timber; for this purpose, Matthew observes, "young trees of about nine inches in diameter in root-cuts from ten to twenty feet in length with a gentle bend at one end, such as Larch receives from the south-west wind, are the most suitable." "The log," he adds, "should be kept in the bark until used; and in dry weather, the boards put upon the boat's side within two or three days from being sawn out, as no timber we are acquainted with parts sooner with its moisture than the Larch, and the boards do not work or bend pleasantly when dry." The same author also recommends from his experience, the roots of Larch, or rather the main roots with a portion of the stem which forms an angle with them, as the best of all knees for ship-building, for they are, he says, "possessed of such strength and durability, and of such adaptation, by their figure and toughness, that were a sufficient quantity in the market, and their qualities generally known, we believe that none else would be used for vessels of any description of timber; even for our war navy of oak." Directions are also given how to prepare the roots for this important purpose, which is chiefly effected by gradually baring that portion of the main roots

nearest to the bulb, or commencement of the stem of the tree, access of air being necessary to convert them into proper wood, and keeping them protected from external injury.

Of the various uses to which the Larch is now applied in agricultural and rural affairs, as well as in civil architecture, it is almost unnecessary to enter into detailed particulars, as it is found more generally applicable and efficient under varied circumstances than any other tree. For the most important wood-work of buildings, such as beams, joists, couples, &c., it is superior to the best foreign Pine timber, possessing all its lightness with the strength and durability of the oak; these qualities also render it excellent for mill axles and other works subjected to heavy weights and severe cross strains. It is also when old and matured, that is with a large portion of its substance converted into red or heart wood, a desirable material for the interior finishing of houses, as we have seen in several instances, as well as for furniture, which takes a beautiful polish and equals the finest satin-wood in appearance; the only objection to its more general use in the finer departments of the joiner and cabinet-maker being the greater difficulty with which it is brought to a smooth surface under the hands of the workman; but this by judicious management and proper seasoning, if not overcome, may, at all events, be greatly lessened. Of late years it has also been found to form the best sleepers for railways, and the demand for this purpose annually consumes a large proportion of the thinnings from the extensive plantations in Scotland and the north of England.

The early period at which the Larch begins to make a profitable return to the planter, and the comparative value of its wood when young, are features which distinguish it from other trees. As a mere stake it has its

value, and is far superior in durability to one made of any other tree. At ten or twelve years old Larch thinnings are large enough for small railing, requiring little or no repair for many years. At fifteen and from that to twenty years old it becomes strong enough for posts, and a superior description of railing, and at this age, and until it becomes of a size to cut up for gates, (which for durability we find excel those made of the best Memel timber,) materials for buildings, &c., it may be profitably sawn up, and made into strong four-railed hurdles for fencing off cattle and sheep, and which if taken proper care of, will last good, as we have experienced, for upwards of twenty years. In Kent and Sussex, though the soil of these counties is by no means calculated to produce Larch timber, it is grown for hop-poles, which are found to be of first-rate quality, being planted for this purpose in thick masses, the trees not more than two feet from each other, in order that the stems may be rapidly drawn up in height, and with the requisite degree of slenderness. In this way, Loudon remarks, and we can corroborate the assertion, "We have seen the Larch at three feet apart drawn up to a height of forty and fifty feet with clear straight stems admirably adapted for hop-poles, and poles for ornamental purposes in gardening." It has also been occasionally used for the formation of living fences, which are said to bear the shears as well as the Spruce. An instance of such a fence is mentioned by Sir T. D. Lauder, in his edition of "Gilpin," and Loudon describes one made by Mr. Gorrie, who, in order to procure an immediate fence, made use of Larch trees about ten or twelve feet high; these he planted upon the earth cast out of a four-feet ditch, laying them at an angle of about 30° with the horizon, and so placed that their tops inclined over the ditch towards the interior of

the field; the plan succeeded to his wish, and he recommends it to those who may have upland fences to form, and Larches of nine or ten years old to spare from the thinnings of other plantations.

The tanning powers of Larch bark being considerable, for some years it was largely used in the manufacture of certain descriptions of leather, and this continued as long as the price obtained for the bark remunerated the grower for stripping his thinnings. Of late years, however, the great fall in the price of oak bark, which was always considered to be worth double that of the Larch, has so reduced the value of the latter, as to render it an object of trifling importance to the planter, as the expense attending the peeling of the trees, and the moving and carriage of the bark would equal, and in many cases exceed, the price that could be obtained from the tanner.

The natural habitat of the Larch being the deep glens and declivities of hilly regions, and the soils in which it attains its greatest perfection those composed of the débris of the older series of rocks, it is evident that the nearer the situations selected for the cultivation of this tree resemble those of which it is a native, so much more certain is the prospect of its succeeding and becoming valuable timber; the Highlands of Scotland, and the mountainous parts of England, where these conditions exist, are, therefore, those best calculated for the extensive growth of Larch, and in all these localities it ought to take precedence of every other tree. Upon lower levels, and in the champaign parts of the country, it also grows with great rapidity; and, provided the quality of the soil be such as to suit its habit, produces large and valuable timber; there are, however, certain descriptions of ground upon which the Larch, though it may grow with apparent vigour for the first twenty or

twenty-five years, begins afterwards to rot at the heart, and, if allowed to stand for any length of time after this has commenced, becomes unfitted for general use. Such we have found to be the case in our own neighbourhood upon moory soil, with a strong iron till or moorband beneath, and also in parts where the recent sand-stone rocks prevail. In many parts of Scotland the same takes place upon richer soils, derived from easily decomposed trap. In Dumfriesshire, wherever the red sand-stone appears, the Larch soon becomes tainted with heart-rot, while that grown upon the adjoining grauwacke is sound, and of good quality. "In the vale of Annan," Sir William Jardine remarks, "whenever the sloping banks have a substratum of this rock, (viz., red sand-stone,) or one composed of red sand-stone gravel, the outward decay of the tree is visible at from fifteen to twenty-five years of age." Mr. Matthew, in his "Treatise on Naval Timber," and who to practical adds scientific knowledge, when treating of the Larch, divides soils and subsoils into two classes; the first, in which the Larch will acquire a size of from thirty to three hundred solid feet, the second, where it only reaches from six to twenty solid feet, and in most cases becomes tainted with rot before thirty years old. As our own experience has shown us the general correctness of his views, we make no apology for quoting the heads of his observations on this interesting subject. Of his classes of soils and subsoils proper for the Larch, the first is "sound rock with a covering of firm loam, particularly when the rock is jagged, or cloven, or much disrupted, and mixed with the earth;" this applies more particularly to the Highland districts, where the primitive rocks prevail, and which we have already shown to be most congenial and natural to the Larch. The second, "gravel not too fer-

ruginous, and in which water does not stagnate in winter, even though nearly bare of vegetable mould, especially steep slopes, and where the air is not too arid, is favourable to the growth of Larch;" this refers to the straths or valleys of the large rivers in Scotland, in their passage through the Alpine country where, he remarks, "they are occupied for several hundred feet of perpendicular altitude up the slope, by gravel, (composed of the débris,) which covers the primitive strata to a considerable depth." The third "comprises dry soils and sound brown loam; soils well adapted for red clover and wheat, not too rich, and which will bear cattle in winter, are generally congenial to Larch." This applies to lower districts either with a flat or undulating surface. The fourth, "All very rough ground, particularly ravines, where the soil is neither soft sand nor too wet, also the sides of the channels of rapid rivulets." Such are the denes and gills of the northern parts of England and south of Scotland, in which the Larch is always found to thrive more luxuriantly and to produce finer timber than upon a flat and level surface. The second class consists of soils and subsoils where the Larch takes dry-rot, the first of which are "situations (steep slopes excepted) with cold till subsoil, nearly impervious to water. This is most fatal to the Larch where moorish dead sand alone, or mixed with peat, occupies the surface." Firm retentive clays, if well surface-drained, we find become much ameliorated and will bring Larch to a large and valuable size, before any indication of heart-rot commences. Under this head, he also remarks, that "in general, soils whose surface assumes the appearance of honeycomb in time of frost, owing to the great quantity of water imbibed by the soil, will not produce large or sound Larch. More than half the low country of Scotland is soil of this description." 2d.

"Soft sand soil and subsoil." In this description of ground the rot is very prevalent, and attacks the trees at an earlier age than in the cold clays or tills. 3d. "Soils incumbent on brittle dry trap, or broken slaty sandstone." In both of these the Larch is generally found decayed at the heart, though those consisting of decomposed trap are often favourable to vegetation and congenial to the growth of various deciduous trees. 4th. "Ground having a subsoil of dry, rotten rock, and which sounds hollow to the foot in time of drought." The 5th "is rich deaf earth or vegetable mould," in which the Larch, independently of its receiving contamination from the putrid gases, or exhalations of the soil, does not seem even while remaining sound to make so much comparative progress in it as some of the hard-wooded trees. 6th. and last, "Black or grey moorish soil with admixture of peat-moss." After this enumeration, Mr. Matthew adds, that, "although the soils specified in this class will not afford fine Larch for naval use, yet they may be profitably employed in growing Larch for farming purposes, or for coal mines, where a slight taint of rot is of minor importance. And further, that Larches in which rot has commenced, are fully as suitable for paling as the sound, "they have fewer circles of sapwood, and more of red or matured."

The cultivation of the Larch in Britain may be considered as undertaken for two distinct objects. 1st. Where it is planted in large masses by itself with a view of producing timber of a large size, fit for naval and other important purposes; and, secondly, where it is mixed with other trees, either to remain and attain its full size, should the soil be such as to bring it to perfection, or to be thinned out as these advance to maturity: its rapid growth and the useful purposes to which its wood, when young,

can be applied, rendering it as an intermediate occupant the most profitable tree to the planter. In forming plantations for the growth of Larch timber of the first description, and which, from the nature and habit of the tree, must generally to ensure success be confined to the mountainous regions of the kingdom, but little preparation of the soil is required, if we except secure fencing, and surface-draining of the moister parts; for, as Larch seedlings of two years old, or strong seedlings one year transplanted, are found to succeed much better than plants of greater size and age, these can be inserted by the slit method, at an expense trifling as compared with pit planting, and at the same time with much greater certainty of success. The rate of plants usually allowed to the acre, in the formation of entire Larch plantations, is from four to five thousand, though the late Duke of Athol, an excellent authority, seems to have considered from two thousand five hundred to three thousand as sufficient. These must be gradually thinned out to three hundred and fifty or four hundred per acre, being the number of trees which it is supposed this quantity of ground is able to bring to perfection; and the last thinning should take place when the trees are about thirty years old.

The time for planting the Larch, whether in alpine situations, or in mixed plantations, should be confined to the interval between the fall of the leaf and the swelling of the buds in the ensuing spring; and as the former does not take place before the end of November, and the latter is in operation by the beginning of April, the period becomes limited to less than four months.

In mixed plantations, such as are made in the lower districts and plains of England and Scotland, the Larch, as we have already remarked, is more frequently used

as a nurse, or intermediate occupant, to be thinned out as the hard wood advances to maturity, than to stand till it becomes the principal crop of timber; and as there are few situations, in the champaign parts of the kingdom, where the Larch retains its soundness when aged and of large size, it is the best and most profitable plan that can be adopted, as no tree, at a similar age, makes so large a return as the Larch. The proportion of Larch to be planted in mixed plantations must, in a great measure, be regulated by the soil, as well as by the kinds of trees with which it is associated, and in relation to which it is to be considered as holding a sudsidiary station; thus, in ground where the Larch is liable to be attacked by heart-rot at an early age, or before it is twenty years old, the quantity may be less, than upon soils where the disease does not appear so early or where the tree remains sound till it has acquired maturity. Speaking generally, we should say that from a half to two thirds of the whole number of trees planted would be a proper proportion of Larch, as the thinnings of this tree, even upon ground eventually producing heart-rot, are, from the various uses to which they can be applied from an early age, much more valuable than those of the Firs, or any species of hard wood.

The thinning of Larch plantations, where large timber for naval and other important works is the ultimate object, requires much attention and considerable judgment in the execution, as the size and cleanness, and consequently the ultimate value of the wood, in a great measure depend upon the mode in which this operation is executed. If long deferred, or neglected during the early growth of the trees, they are apt to be drawn up weak and slender, in consequence of the early and rapid death of the lower branches, from the deprivation of the necessary quantity

of air and light; and again, if thinned at first and when young to wide distances, so as to allow of the permanent retention and free growth of all the lower branches, the stem in that case becomes coarse and full of knots, and of less value; a mean, therefore, between the two extremes is to be adopted, and the thinning so managed, that, at the same time that the lower branches are permitted to perform their important office long enough to ensure the healthy and vigorous growth of the tree, their death should gradually take place as the tree advances in height, so as to leave it with a clean bole of twenty or thirty feet in length, when it has attained maturity. If planted at the rate of from three to four thousand trees to the acre a first thinning will be required within eight or ten years, when the weakest plants, to the extent of about a fourth part, may be cut out; a second thinning may be administered from two to four years afterwards, and must be repeated as the state of the trees may seem to require, till they reach the age of thirty or thirty-five years, when the last thinning should take place, leaving at this period the trees destined to form the ultimate crop of large timber from twelve to fifteen feet apart, as at this distance they have scope sufficient to attain maturity, and dimensions large enough for naval purposes.

In regard to the pruning of Larch, there appears to be a diversity of opinion, some advocating the removal of living branches, by annually cutting off, after the tree has been planted four or five years, one or two tiers of the lowermost branches, till the stem is bared for twenty feet or upwards; others, and, we believe, the majority of writers upon the subject object to the removal of any living branches, and insist that these should remain upon the tree till they decay or die of themselves, as their

presence, so long as they produce leaves to perform their functional office, is essential to the health and proper developement of the tree. To this latter opinion we yield a willing assent, being convinced, not only from physiological inference, but by practical experience, that the Larch suffers as severely as any of the evergreen *coniferæ* by the abscission of living branches, and that the preferable plan is to allow these to die off naturally and by degrees, which they always do when the Larch is planted in mass, and not thinned out too severely when young. Once dead those branches may easily be removed by a slight blow, or, what is better, by an iron hook fixed to the end of a long pole, and, as they break easily off close by the bole of the tree, the small portion of dead, though not decayed, wood of the branch left within the bark, soon becomes covered with a new layer, and as the Larch does not renew its lateral branches, it is evident that all the wood afterwards deposited upon the trunk must be entirely free and clear of knots.

As connected with pruning, we may notice the bending and kneeing of Larch timber for ship-building, a practice strongly recommended by Matthew, who says, "that in all Larch plantations on a proper soil, not too far advanced, a proportion of trees intended to remain as standards should be bent." The operation he directs to commence when the plants are young, or from three feet high and upwards, by bending and fixing them to an angle of from 40° to 60° with the horizon, and the next year bringing them down some degrees lower, according to the size of the plants or the curve required. The same practice, and for a similar purpose, we also find recommended by Billington, Monteith, and Pontey; but the methods proposed to effect it are different, the first-named writer recommending the

tying of young trees to one another, the other two, the planting of Larch under the branches of spreading deciduous trees, which may force them to take a bent position outwards, in order to reach the light and air, a treatment, we feel convinced, under which no Larch can ever retain a vigorous growth, or become fit for the purposes intended. The undermining of trees, so as to throw them over on one side, afterwards to recover their perpendicularity by their annual shoots, has also been suggested by Mr. Matthew and Mr. South as a mode of obtaining crooked timber, but we greatly doubt whether such an operation could be performed without severely affecting the health and ultimate growth of the tree. We have already referred to the fact, that the main root, with a portion of the butt-end of the tree attached, forms an excellent knee for the shipbuilder.

Of the diseases to which the Larch is liable, the heart rot is by far the most important, and one which, it appears, we have little prospect of being able to eradicate or avert, the actual cause from which it originates having hitherto escaped the researches of the physiologist as well as of the planter. Its attack is not confined to one description of soil or situation, as Larch trees are subject to taint in rich as well as in poor soils, at considerable elevations as well as upon levels but little above the sea. Sang mentions it as affecting the Larch on rich banks and in warm situations in Fifeshire. In Dumfriesshire, where the red sandstone appears, it attacks the Larch at an early age, Sir W. Jardine stating to us, that it often shows symptoms of the disease before it is fifteen years old; upon cold wet clays and moorish soil incumbent upon moorband, it frequently begins to show rot before it is twenty years old. This disease commences at the root, and proceeds upwards,

though some instances are reported in which the top seemed first affected. Matthew observes, "the rot commences in the roots which have struck down deepest into the earth, especially those immediately under the trunk of the tree, thence the corruption proceeds upwards in the centre of the trunk, which, when much diseased, swells considerably for a few feet above the ground, in consequence of the new layers of wood forming thicker there, to afford the necessary space for the fluid to pass upwards and downwards."

When cut down soon after the taint has commenced, the wood at the centre of the tree appears dry, tough, and corky, easily distinguished from matured wood in a sound state; if allowed to stand any length of time afterwards decay and rottenness rapidly proceed, and the centre becomes hollow or piped, from which circumstance the disease, in some parts, is known by the name of *pumping*.

Mr. Gorrie, in the "Gardener's Magazine," seems to think, and indeed cites examples to show, that soils which had previously been occupied by Scotch Pine tend to produce and promote the rot in Larch, and states that, wherever a crop of Larch has succeeded one of Scotch Pine, there the disease has made rapid progress; that plantations on the same estate, planted at the same time, and similarly circumstanced as to soil, &c., with the exception of not succeeding a crop of Pine, have continued entirely free from rot; he therefore infers, that the decaying roots of the Pine may form a powerful agent in promoting the disease, in which view he is supported by the concurrent testimony of Mr. James Young of Pitfour. That such may be the case, and the disease induced under the circumstances above stated, we do not deny; but still, when we find that it is equally prevalent in rich soils, in dry

sand, and in cold wet clays, where no previous crop of Pine has existed, we are inclined to think, with Mr. Matthew, that "there must be some constitutional tendency to corruption in the Larch, which is excited by a combination of circumstances, and that we must limit our knowledge, for the present, to the fact, that certain soils, perhaps slightly modified by other circumstances, produce sound, and others unsound Larch."

The canker is another disease which has been found affecting the Larch in some plantations at Athol and Dunkeld, formed since the commencement of the present century upon land that had previously borne crops of corn, as well as in wet situations; it is described by Mr. Munro, in the ninth volume of the "Gardener's Magazine," as a malignant distemper, resembling the canker in apple-trees. "First," he says, "a branch gives way, then a black liquid issues from the point of union with the trunk, the regular ascent of the sap seems impeded, and the albumen is disposed in rather large quantities on each side of the affected part, which gives the tree a very unsightly and gibbous appearance." Of this disease we are able to give no further details, as it seems to have been unnoticed by other writers, and has not come under our own observation in any of the Larch plantations in this immediate neighbourhood.

Of the insects which infest the Larch, the *coccus*, or *eriosoma laricis*, commonly known by the name of Larch blight, is by far the most injurious, though seldom to such extent as to destroy the tree, which in the case of the Silver Fir is often done by a nearly allied congener. This insect was first observed by Sang, upon the Larch at Raith, in Fifeshire, about 1785; and in 1795 the Duke of Athol's attention was directed to it, in consequence

of its prevalence in his extensive plantations. It is probable, however, that it was introduced at a much earlier period, or with the original plants, but that it remained unnoticed so long as the trees were dispersed and few in number, and its increase had not been encouraged by large and dense plantations. As might be expected, its prevalence and effects have been most conspicuous in seasons when the early growth of the larch has been suddenly checked, or injured by heavy frost-fogs, or biting winds in spring, for in such years the insect obtains an advantage during the check of vegetation, which the tree does not so easily overcome. In winter the eggs of the *eriosoma*, where numerous, may be detected even by the naked eye, thickly crowded together around the base of the buds, and in the small depressions and crevices of the bark of the last year's wood, in the form of small black grains. As spring advances these eggs are hatched, and the female insects excluded soon give birth to an innumerable living progeny, which, as the leaves expand, spread themselves over the foliage, at first small and black, but as they increase in size becoming covered with a white, flocculent, cottony-looking substance, which is produced from tuberculous pores upon the different parts of their body, and the trees become clammy and black with the honey dew, or excrementitious discharge of the insects which live upon the resinous sap of the tree, pumped out by means of a delicate tubular proboscis. Towards the end of summer the males are produced; these, in their perfect or imago state, are furnished with wings, and in autumn may be seen in thousands, flying actively about the Larch plantations. For some years the appearance of the *eriosoma* caused great alarm, and apprehensions were entertained of its proving a serious objection to the

cultivation of the Larch ; but experience showing that its attack rarely proved fatal, it has ceased to attract the notice of planters, though it still continues annually to infest the Larch, to a greater or less extent, as the seasons happen to be propitious or adverse to its increase.

The propagation and nursery culture of the Larch is carried to a great extent in Scotland and the north of England, many millions of young plants being annually raised from British-grown seed.

The extraction of the seeds from the cones is a matter of some difficulty and trouble, and various methods to accomplish it have been resorted to ; the most approved, and under which the seeds suffer the least detriment, is by the operation of splitting, which is effected by means of a small, flat, triangular instrument, with the cutting angles and point well sharpened. By this instrument the cones are divided into four divisions, from which the seeds are easily procured by placing them in the sun, or exposing them to a very gentle heat. Kiln-drying, or subjecting the entire cones to considerable fire heat is sometimes used, but this, if not destructive of vitality altogether, must prove injurious to the seeds and the constitution of the plants they produce. Mills for crushing the cones and separating the seed have also been tried, but in all these a large proportion of the seed is lost and destroyed, by being bruised in the operation. The seeds are generally sown in April, upon land previously prepared and rendered very fine, and so thick as to rise within a quarter of an inch of each other ; after being pressed down by the back of the spade or small roller, they should be covered with fine earth, to the depth of from a quarter to half an inch according to the quality of the soil. After remaining two

years in the seed-bed, they may either be transplanted from thence at once, into the plantations where they are to remain, or run into nursery rows for one or more years, in order to meet the views and purposes of the various buyers.

As usually seen in plantations or when drawn up in thick masses for the sake of its timber, divested of its lower branches, and presenting nothing but a naked stem with a small conical top composed of branches diminutive as compared with the bulk of the trunk, the Larch has few pretensions even in summer and when clothed with foliage, to the title of an ornamental tree, much less so in winter, when, denuded of foliage, it wears a death-like aspect, rendered still more striking from its contrast with the evergreen coniferæ, whose foliage, deep and sombre though it be, always indicates that freshness and vitality of which the other seems deprived. To render it an ornamental appendage to the lawn, the Larch requires a management different from what it receives when planted in mass or in thick plantations; ample room must be given it on every side, in order that the branches may have their full scope, and suffer no impediment in their growth. Under such treatment the lower branches increase in size and length, retaining their vitality as long as the tree itself, which then presents the appearance of a regular and often beautiful cone, refreshing the eye in earliest spring with the lively pea-green tint of its young and tender foliage. It is, however, in Alpine situations, and in its native steeps that we must look for the Larch in its characteristic beauty, as well as its finest and boldest form, where, uncontrolled and unimpeded in its growth, it assumes a vigour and strength of character rarely seen in our plantation Larch, except it be in some choice locality,

similar to a native site amid the fastnesses of the Highland rocks.

Accident also frequently contributes to the effect and picturesque appearance of the Larch, exemplified in the tree at Dalwick, figured in the "Arboretum Britannicum," and several others that have come under our observation. Upon the whole, however, we hold it to be inferior in beauty and effect even in its highest developement to many of the evergreen coniferæ, among which stands pre-eminent the magnificent Lebanon cedar.

In addition to two of the original trees still flourishing at Dunkeld, those at Dalwick in Peebleshire, before described, and various others of nearly a similar age, there are now numerous Larches of younger growth to be found, of nearly equal dimensions, in many parts of Scotland. In England, besides the trees recorded by Loudon, we may mention a Larch at Constable-Burton, near Bedale, Yorkshire, planted in 1775, whose girth at three feet from the ground is nine feet four inches, its estimated height one hundred and ten feet, and its solid contents of timber, one hundred and fifty-six feet. In Stanwick Park, the seat of Lord Prudhoe in the same county, are three Larches measuring respectively, at three feet from the ground, nine feet eleven inches, nine feet nine inches, and nine feet four inches, and supposed to be nearly a century old. These trees stand upon a deep deposit of dry loamy gravel.



Genus *Cedrus*. BARRELIER. LINN. *Syst. Monœcia Monadelphia.*

Cedrus Libani. BARR.

CEDAR OF LEBANON.

Cedrus Libani,	BARR. Icor. 499.
	LAWSON'S Man. p. 380.
	LOUDON'S Arb. Brit. ch. cxiii. p. 2402.
Pinus cedrus,	LINN. sp. pl. 1420.
	HUNT. Evel. Sylv. p. 311.
	AIT. Hort. Kew. iii. p. 369.

INDEPENDENTLY of the natural grandeur and beauty of the Lebanon Cedar, the associations connected with it as

a tree so frequently and honourably mentioned in Holy Writ give it an interest surpassing that of any other coniferous species; and though it has not hitherto been planted in Britain as a timber-tree with a view to profit, its introduction upwards of one hundred and fifty years ago, and the numerous, and in many instances noble specimens now existing in various parts of the kingdom, give it a fair and just claim to notice in the present work.

Specifically it is distinguished by having the leaves tufted, persistent, the cones ovate, abrupt, from three to five inches long, and from two to two and a half broad, their scales close-pressed; seeds irregularly triangular in form, with a broad membranaceous wing.



When young, the Cedar, like others of the pine and fir tribe, presents a pyramidal or spiry form, the leading shoot continuing rapidly to elongate, and the lateral branches springing annually in regular whorls around its base. At an early age also, the leading shoot generally exhibits an inclination to one side; but this disappears as it gains strength and age, and in the full-grown tree the bole is usually seen straight and erect. As it approaches maturity, and reaches its greatest height, which varies from fifty to eighty feet, the leading shoot becomes greatly diminished or entirely ceases to elongate; at the same

time the lateral branches increase in size and length, so as at last to cover a space whose diameter is often much greater than the height of the tree itself. In this state the Cedar presents the form of a wide-spreading tree with a flattened pyramidal head, the branches and foliage being disposed in regular tiers or stages, an effect resulting from their horizontal disposition, and from the flat fan-like growth of the branchlets, thickly beset with their tufted leaves. This, we may remark, refers to the usual growth of the Cedar when planted singly or with sufficient room in all directions, for the free expansion of its limbs; for when planted in company with, or drawn up among other trees, it loses, like most of the firs, the lower branches, and produces a clean straight trunk, and in this state, except for its permanent foliage, might easily be mistaken for the larch.

The leaves, which remain two years upon the branches, are singly disposed upon the shoots of the current year, like those of the larch; but as numerous buds are formed upon the young wood, from each of these in the following season a tuft or circle of leaves is produced; these leaves are succeeded by others for many years in succession, and cause a very small elongation or annual growth of the bud, which may be recognised in the narrow rings composing the basal part of such buds as have been in existence for several years. From some of these buds eventually proceed the male and female catkins, the former of which are solitary, single, about two inches long, and turning upwards, composed of numerous imbricated and sessile stamens on a common axis.

The pollen, which is abundant, and of a pale yellow colour, is produced from two celled anthers, which crown each stamen. The female catkins are short, oval, and

erect, changing, after fecundation, into oblong-ovate cones, which, when matured, vary from about three to five inches in length. In a young state, the cones are of a greyish green, tinged with a pink bloom, which they lose as they become ripe. The scales of the cones are very broad, with truncated summits, thin in texture, and with the edges slightly denticulated. At the base of each scale are two seeds, triangular in shape, nearly enveloped, and surmounted by a fine membranaceous wing, broadest on the upper part. The cones remain attached to the trees for several years, and the seeds are set free and distributed by the scales gradually becoming loose and dropping from the axis, which still remains fixed to the branch. The cones abound with resin, which is frequently seen in drops exuding from between the scales, or covering their exterior. The Cedar rarely produces cones before it is twenty-five or thirty years old, and Loudon mentions, that there are trees at Whitton, Pepper-Harrow, &c., upwards of one hundred years old, that have scarcely ever produced either male or female catkins.

The geographical distribution of the Cedar is not confined, as many have supposed, to Lebanon itself, as, of late years, it has been found occupying sites on several mountains of the same group; it has also been discovered on Mount Atlas, and Loudon mentions that specimens of cones, leaves, &c., have been received from Morocco, by P. B. Webb, Esq., showing the probability "that the range of the tree not only extends over the whole group of mountains which is situated between Damascus and Tripoli, in Syria, and which includes the Libanus and Mounts Amanus and Taurus, of antiquity, and various others, but that its distribution on the mountainous regions of the North of Africa is extensive." Indeed, if we are to suppose that

the Cedar, and the Cedar wood, mentioned by many of the ancient writers, referred exclusively to the Lebanon species, we must believe that its distribution, at one period, extended over countries where no trace of its having existed now remains, as Egypt, Crete, Cyprus, &c., are mentioned by Pliny and Theophrastus as native habitats of the *Cedrus;* but as it appears that several coniferous species, particularly those belonging to genus *juniperus* and *cupressus*, went by the common name of *Cedrus*, and several of these were natives of the countries mentioned in their writings, we may fairly infer that the *Cedrus* of the ancients as frequently had reference to other *coniferæ* as to the Lebanon species. It has also been described as a native of Siberia and the Altaic Mountains, upon the supposed authority of Pallas; but this proves to have been an error, originating in a mistake of the French translator of the travels of that eminent naturalist and botanist, who, meeting with the word Kedr, the Russian name for the *Pinus cembra*, which is a native of Siberia, concluded that it must mean Cedar, and so translated it. In the "Flora Rossica" of Pallas, no mention whatever is made of the Lebanon Cedar, but, as might be expected, the *Pinus cembra* is included, and the habitats, &c., duly given.

But although among the ancients several *coniferæ* might go under the common denomination of *Cedrus*, it is evident that the Cedar proper was well known and recognized from the earliest periods of history, the frequent allusions to it in the Bible, and the descriptions there given of it in various passages, being all remarkably expressive and characteristic of its qualities; thus, in the twenty-ninth psalm we have one descriptive of its strength and power, where the inspired writer exclaims:—"The voice of the Lord breaketh the Cedars; yea, the Lord breaketh the Cedars of Le-

banon :" others, again, refer to the magnitude of its dimensions, and the wide spread of its boughs; as in that passage of the eightieth psalm, when speaking of the Israelites under the figure of a flourishing vine, he adds:—" The hills were covered with the shadow of it, and the boughs thereof were like the goodly Cedars;" and again the ninety-second:—" The righteous shall flourish like a palm-tree, and shall spread abroad like a Cedar in Libanus." But the most striking and magnificent description is that of the prophet Ezekiel, when he describes Assyria, or the Assyrians, under the figure of a mighty Cedar of Lebanon; " Behold," &c. (from verse 3 to 9, ch. xxxi.)

Cedar wood is also mentioned in the Pentateuch, and we learn from the sixth and seventh chapters of the first of Kings, that the chief timbers and wood-work of the far-famed temple built by Solomon, as well as that used in the finishing of his own house, called " the house of the forest of Lebanon," were mostly of Cedar, brought from that mountain by the permission of Hiram, King of Tyre, to whom Solomon annually paid, during the progress of the work, a contribution consisting of twenty thousand measures of wheat, and twenty measures of pure oil, and further, that no less a number than fourscore thousand hewers were employed in the mountains.

In regard to the Cedar and Cedar wood mentioned in profane history, it is difficult, from what we have already stated, to determine what has reference to the true Cedar, and what belongs to other coniferous species; all that we know for certainty, is, that a wood called Cedar, distinguished for its incorruptible nature, was frequently used for purposes most important in the eyes of the Pagan, viz., in the building and decoration of their temples, and for the statues or images of their heroes and gods. Thus

Virgil,* when describing the temple of the ancient Laurentum, says:—

> "Quin etiam veterum effigies ex ordine avorum
> Antiquâ e Cedro."

Pliny also makes mention of Cedar wood and the uses to which it was applied, and cites, as examples of its durability and imperishable nature, the timber of a temple of Apollo at Utica in Africa, which, when nearly two thousand years old, was found to be perfectly sound, and the famous statue of Diana in the temple of Saguntum in Spain. Cedria, an oil or resin extracted from a Cedar, was, also, according to Vitruvius, used to smear over the leaves of the papyrus, to prevent the attack of worms; and Pliny states that the Egyptians applied it, with other drugs, in the preparation of their mummies: but whether this extract was obtained from the Lebanon Cedar, or from trees belonging to the genus *cupressus* or *juniperus* which also afford odoriferous resins, it is now impossible to ascertain. Passing to the modern history of this tree, we find that Lebanon and its Cedars have been an object of interest to all Eastern travellers, since the time of Belon, who visited Syria about A. D. 1550, and is one of the first who describes that particular group of large and ancient Cedars which, for many ages, have been regarded with the greatest respect and veneration by the inhabitants of that country, and particularly by the Maronite Christians, who annually celebrate the festival of the Transfiguration beneath the shadow of their enormous boughs. At the time of his visit these ancient trees were supposed to amount to about twenty-eight, "though, he says, it is difficult to count them, they being distant from each other

* Virg. Æn. lib. vii. 177.

a few paces;" and this accounts for, or accords with, the superstition mentioned by Thévenot, a French traveller, who visited Lebanon in A. D. 1655, viz., that as often as the Cedars of Lebanon are counted over they are found each time to vary in number. According to this traveller, the trees, at the time of his visit, amounted to twenty-three. From Maundrell, who travelled in Syria in 1696, we have a more particular description of these celebrated remains of the ancient forest:—"These noble trees," he says, "grow amongst the snow, near the highest part of Libanus, and are remarkable as well for their own age and largeness, as for the frequent allusions made to them in the Word of God. There are some very old and of prodigious bulk, and others younger of a smaller size. Of the former I could reckon up only sixteen; the latter are very numerous. I measured one of the largest, and found it twelve yards six inches in girth, and thirty-seven yards in the spread of its boughs.* At about five or six yards from the ground it was divided into five limbs, each of which was equal to a great tree."

The next account is that of Dr. Pococke, who travelled in Syria in A. D. 1744 and 1745, or about forty-eight years after Maundrell's visit. In the second volume of his "Description of the East," he thus details his interesting account of Lebanon and the state of its ancient Cedars: "From the Convent of St. Sergius, there is a gentle ascent for about an hour, to a large plain between the highest parts of Mount Lebanon. Towards the north-east corner of it are the famous Cedars of Lebanon; they form a grove about

* This, it would appear, must have been the diameter, and not the circumference of its spread, as Miller, in his "Dict. Art. Cedrus," states that a friend of his who had visited Syria, confirms Maundrell's account, except that he found the diameter of the spread of the head to be twenty-two yards, and not thirty-seven yards in circumference, as had been supposed from Maundrell's measurement.

a mile in circumference, which consists of some large Cedars that are near to one another, a great number of young Cedars, and some pines. The great Cedars at some distance look like very large spreading Oaks; the bodies of the trees are short, dividing at bottom into three or four limbs, some of which, growing up together for about ten feet, appear something like those Gothic columns which seem to be composed of several pillars: higher up they begin to spread horizontally. One that had the roundest body, though not the largest, measured twenty-four feet in circumference; and another with a sort of triple body, as described above, and of a triangular figure, measured twelve feet on each side. The wood does not differ from white deal in appearance, nor does it seem to be harder. It has a fine smell, but is not so fragrant as the juniper of America which is commonly called Cedar; and it also falls short of it in beauty. I took a piece of the wood from a great tree that was blown down by the wind and left there to rot. There are fifteen large ones standing."

From Pococke's visit, to the commencement of the present century, we have no particular details of these celebrated trees. In 1813, Kinneir* states, that he met with no Cedars except upon Lebanon, where they amount to four or five hundred in number. Wolff, in the "Missionary Journal" for 1823 and 1824, describes his visit to Lebanon, where he counted thirteen large and ancient Cedars, besides numerous smaller ones, amounting in all to three hundred and eighty-seven trees. Again, Buckingham, in his "Travels Among the Arab Tribes in 1825," speaking of his visit to the Arz-el-Lebinien, or Cedars of Lebanon, says:—"There are at present, I should think,

* Travels in Asia Minor, &c. in 1813 and 1814.

about two hundred in number, all fresh and green. There are," he adds, "about twenty that are very large, and among them several that have trunks from ten to twelve feet in diameter, with branches of a corresponding size, each of them like large trees spreading outwards from the parent stock, and overshadowing a considerable piece of ground." About four years afterwards, Lebanon was visited by Dr. Pariset, who, in a letter published in the "Histoire du Cèdre," by Loiseleur des Longchamps, states, that the large trees were then not above twelve, the smaller from four to five hundred in number. In A.D. 1832 they were again visited by Lamartine,* who passes some remarks upon their decrease, from the time of their having been first visited by the earlier travellers, and says there are now but seven of the ancient trees remaining; these, however, from their enormous size and general appearance, he thinks may have existed in Biblical times. One of the latest accounts we have to notice, is that of M. Laure,† who visited Mount Lebanon, in company with the Prince de Joinville, in September, 1836, and he states that fifteen out of the sixteen trees mentioned by Maundrell are still in existence, though all are more or less in a state of decay, and he adds, that there is not one young Cedar in all the wood or grove of El Herzé.

The precise period of the introduction of the Cedar into England seems undetermined; for though Aiton, in the "Hortus Kewensis," places it in A.D. 1683, the date of the planting of the trees in Chelsea Botanic Garden, where two out of the four originally planted are still in existence, other circumstances, and amongst them the size of these very

* Pèlerinage à Jérusalem, vol. ii. p. 355.

† Laure, Cultivation Provinçal, p. 317, quoted in Loiseleur des Longchamps' "Histoire du Cèdre."

trees, which when planted, were three feet high, indicate an earlier introduction. We give no credit, however, to the tradition, that the old Cedar at Enfield, or that at Hendon, which was blown down in 1779, were planted by Queen Elizabeth; indeed it is evident, from the silence of Turner, and other writers of that period, in regard to the Cedar, that it was not introduced till after her reign. Loudon thinks it very probable that Evelyn was its first introducer, and that the Enfield Cedar was given by him to Dr. Uvedale, who resided there between 1655 and 1670; for in his "Sylva," written in 1664, after praising the Cedar as a "beautiful and stately tree, clad in perpetual verdure," he adds, that "it grows even where the snow lies, as I am told, almost half the year, for so it does on the mountains of Libanus, from whence I have received cones and seeds of these few remaining trees. Why then should it not grow in old England? I know not, save for want of industry and trial."

It seems, therefore, very likely that the Enfield tree was raised from the very seed or cones he mentions; for if sown about 1654 or 5, the young trees would be in a fit state to transplant between that period and 1670, that is, during the time Dr. Uvedale resided at Enfield. Its introduction has also been assigned to Sir Stephen Fox, the ancestor of the Holland family; for, in a communication to Mr. Loudon, from the late Lord Holland, in 1836, that nobleman mentions a Cedar that grew at Farley, near Salisbury, the native village and burial-place of Sir Stephen Fox, "the very first, I believe, ever planted in England. It was standing, in 1812, near the vault of Sir Stephen Fox, who had imported it from the Levant, and who planted other Cedars in the gardens at Chelsea." This venerable specimen, it appears, was grubbed up in 1813,

when the weight of its timber was found to be upwards of thirteen tons. In Scotland its introduction did not take place till A.D. 1740, when some plants were brought by the then Duke of Argyle to Hopeton-House, where three of the trees there planted are still in a flourishing state.

After the Cedar had been for some time introduced, and, contrary to the expectation of those who remembered only the country, and not the elevated situation whence it came, was found to be perfectly hardy and unaffected by our climate or the severity of our winters, it was, to a limited extent, cultivated for its ornamental properties; and there are few country seats of any note, in Britain, that cannot boast of specimens of this noble tree. We regret, however, that few attempts have been made to grow the Cedar for its timber, or to test it as a profitable tree to the planter, nor have sufficient experiments been instituted to ascertain the highest altitude at which it will thrive, or compete in growth with other coniferous species. From the height at which it is found to flourish upon its native mountains, and the degree and length of cold to which it is there subjected for several months in the year, there can be little doubt but that it would be found scarcely inferior, in hardihood of constitution, to the larch, and might be successfully cultivated, either in masses by itself, or mixed with that tree, in those mountainous districts where the larch grows with the greatest vigour and produces the finest timber. To this, perhaps, may be objected the difficulty of procuring plants in sufficient number, and their greater cost as compared with those of the coniferous species usually planted; but this, we think, would be obviated by the exertions which the nurserymen, under such circumstances, would make to procure seed, not only from the old cone-bearing trees in Britain, but from those

parts where it is now ascertained to be a native. As to the slow rate of growth, which, by many, is erroneously attributed to the Cedar, this applies to it only at a very early age, or for the first six or eight years, and even during this period it is not slower than that of the silver and some other firs. Planted under favourable circumstances, and once fairly established in the ground, its growth has, in many cases, proved to be greater than that of most other resinous trees: thus Loudon remarks, that at Whitton neither the pinaster, the Scotch pine, the silver fir, nor the larch, though planted in the same soil and situation, had, at a certain age, made so much timber as the Cedar, two of which trees, in 1837, then one hundred and five years old, were upwards of seventy feet high, with trunks fourteen feet six inches in circumference at two feet from the ground. The growth of the old Cedars in the Chelsea Garden also, appears to have been very rapid during the first eighty-three years, as, at that age, two of them girted twelve feet six inches each, at two feet from the ground; but this rapid increase was soon after checked by the draining of a pond near which they stood, and into which their roots extended.

Other instances of the rapid growth of the Cedar are mentioned by Loudon; one, where a tree forty years old had reached a height of fifty feet with a diameter of bole of three feet six inches; another, where trees only twenty years old were thirty-six feet high, with trunks which girted four feet six inches at three feet from the ground. Our own observations, and the advance of some Cedars we possess, are confirmatory of Loudon's observation, that the growth of the Cedar, when planted in favourable situations and good soil, is nearly as rapid as that of the larch, at least, such we believe to be the case after its roots are once fairly established in the ground.

Though the wood of the Cedar appears to have been held in high estimation by the ancients, who considered it, in addition to its other properties, to be almost incorruptible, it is certain that the produce of those grown in this country, is remarkable neither for its durability, texture, nor appearance; this, however, we allow may, in a great measure, be the result of climate and situation, and it is not improbable but that the wood of the Cedar grown upon the Lebanon, and other native sites, may possess properties which it can never acquire in the plains of England; we may also attribute the high character which Cedar wood anciently obtained to this circumstance, viz., that the wood of other trees which actually possess the before-mentioned qualities, was also called by the name of *Cedrus*, so that it is impossible, where Cedar wood is mentioned in the writings of ancient profane authors, to determine to what species it actually belonged. The usual appearance of the wood of English grown Cedar is that of common deal, the section of the trunk bearing a near resemblance to that of the silver fir. In colour it is of a pale reddish-white, its texture light and spongy, soft, and easily worked, but apt to warp, split, and shrink in drying, and, when exposed, by no means durable. The scent of the wood is very similar to that of the larch, and not of that high aromatic flavour assigned to it by the ancients, and which we meet with in some of the species of the genus *juniperus*. In the "Arboretum Britannicum" Loudon mentions a slab of Cedar wood, part of a large tree blown down, at Whitton, in November, 1836, and given to him by the proprietor; of this he had made a table, which presented nothing attractive in its appearance, being similar to deal in veining and smell: of the same character and appearance was another table,

which Sir Joseph Banks had made out of the celebrated Hillingdon Cedar, a tree mentioned by Gilpin, in his "Forest Scenery," and described by him as the finest English specimen he had seen. Loudon also mentions the result of several experiments made with a portion of the wood in his possession, which proved it to be very inferior in strength to that of the common English grown Scotch pine. Of the appearance and texture of the wood grown upon its native mountain, we have the remarks of Dr. Pococke, already quoted, which certainly indicate nothing remarkable or curious in its appearance. That it is, however, sometimes of a firmer texture and finer grain, appears from what is said in the "Histoire du Cèdre," of a piece of Cedar wood brought from Mount Lebanon by Dr. Pariset, in 1829, and which, when made into a piece of furniture, presented a compact surface, agreeably veined and shaded, and, upon the whole, handsome in appearance. As fuel the Cedar burns quickly, with a lively flame, but without emitting much heat, in which respect it is greatly inferior to the wood of the beech or the oak: the bark also contains tannin, but the astringent principle, according to Chevreuil is, to that of the oak, only as 12·75 is to 19·75. Upon the whole, since the wood of the Cedar, when grown at a low elevation in the plains of Britain, appears to be of a quality much inferior to that of the larch, and scarcely equal to that of the other evergreen *abietinæ* usually planted, it would not seem advisable to substitute it for them, or to plant it on an extensive scale, with a view to profit; and as to its adaptation for more elevated districts, or the improvement its timber might undergo in such localites, we have no data whereon to form an opinion, as no attempts, we regret, have yet been made to cultivate it in such situations.

It is, therefore, as an ornamental object and appendage to the residences of our gentry, and on account of the grand effect it is calculated to produce in landscape scenery, more particularly when associated with public buildings, palaces, or mansions of imposing character, that the cultivation of the Cedar deserves to be encouraged, and not for the value, or any profit likely to be derived from the timber it produces, at least when planted in the lower parts of England and Scotland.



CEDAR IN CHELSEA GARDENS.

As compared with other evergreen coniferous trees, it surpasses them all in grand and picturesque effect; and, when arrived at maturity, or approaching those gigantic dimensions which it acquires in its native habitats, may justly be considered as one of the most magnificent of the vegetable creation. In its form and mode of growth every circumstance is calculated to give it an imposing and noble aspect: the trunk being massive, and of a large diameter in proportion to its height, indicates that strength

and longevity by which it is characterised in passages of Holy Writ, whilst its pyramidal head, composed of numerous and horizontal boughs, rising tier above tier in thick succession, and clothed with a mantling foliage of never-fading green, forms a canopy, or as the Prophet Ezekiel expresses it, "a shadowing shroud" of vast extent and striking appearance. This grandeur and beauty of form naturally associates the Cedar, in our ideas, with objects of importance and scenery of the loftiest description: and hence it is that it becomes a more appropriate ornament and appendage to imposing architectural masses, and grounds of wide extent, than to the precincts of a modern villa, where none of the accompaniments are of a corresponding magnitude, or in accordance with those feelings which its presence is calculated to excite. Such, also, seems the feeling of eminent painters in regard to this tree, whenever it can appropriately be introduced into their compositions. Thus, in several of the wonderful and highly imaginative pictures of the celebrated Martin, the Cedar is prominently brought forward, particularly in his representation of the destruction of Babylon, where it is made the principal tree in its far-famed terraces and hanging gardens. It is also a prominent object in the gardens of Nineveh, as represented in his fall of that city, and ancient Cedars also enter into his imaginary view of the Garden of Eden.*

Though the Cedar will grow in a variety of soils, it seems to thrive more vigorously, and to attain larger dimensions, in those of a light quality, such as gravelly and sandy loams, than in those of a stiff or clayey nature, pro-

* In the "Gardener's Magazine," i. p. 122, there is a paper by Mr. Thompson, an artist, containing many apposite and just remarks on the effect of the Cedar in landscape scenery, to which we refer our readers.

vided the former be not too dry, and its roots can have free access to water; for it has always been observed to flourish best when planted within a short distance of the margins of ponds, or the brinks of running streams. In the neighbourhood of London, Loudon tells us, it has attained, the largest size in a deep sandy though not a poor soil, as at Syon, Whitton, and Pains Hill, and that at Whitton, the roots of the largest and highest tree are within reach of water. Sir T. D. Lauder also remarks, that "the Cedars of Lebanon grow in a wet mountain soil, and are exposed to as much frost and snow as occurs in most parts of Scotland." We, therefore, never find the Cedar injured by frosts in this country; but when placed in gardens, and in a dry situation, both with regard to soil and climate, it becomes a mere bush, compared to that lofty tree which it naturally ought to be. In the lowlands of Scotland," he adds, "the Cedar can scarcely be placed too wet, and will succeed better in a wet mountain soil in a Highland wood, than in the best garden in the country." So far as our own observations have been directed towards this tree, we fully concur in opinion as to its preference of a springy moist situation to one that is dry, and we have little doubt but that, in hardihood of constitution, it is nearly upon an equality with the Larch, and would succed in mountainous districts at altitudes little inferior to that tree.

The seeds of the Cedar are obtained from the cones, which are not ripe till the autumn of the third year after their first appearance upon the tree; they are most readily extracted by steeping the cones, for a day or two, in water, and then splitting them through their axis by means of a sharp conical iron spike, which allows the scales to be opened and the seeds to fall out. These should be sown without delay in light rich soil, and covered to the depth

of about half an inch, either in the open ground, or what is preferable, in large boxes, which ensures the preservation of all the roots in transplanting the seedlings. In commercial nurseries, from whence the plants, when sold, have frequently to be sent to considerable distances, it is best to transplant the seedlings into small pots, as they carry better, and the roots are preserved entire, so that little risk of failure is incurred when placed in their permanent stations; but in private nurseries they may be run into lines in the open soil, in the same manner as the larch and other species of the *abietinæ*. Great care should be taken, during the nursery culture, to preserve the leading shoot, as plants are often a long time in recovering or renewing it when broken off. When planted for ornament, the Cedar should have sufficient room for the free expansion of its branches, as upon the retention of these the beauty and picturesque form of the tree mainly depend, and as has been recommended in the case of other evergreen *coniferæ*, the pruning knife should rarely, if ever, be applied to a living branch.

Of recorded British trees, the most remarkable appears to have been the Hillingdon Cedar, mentioned by Gilpin as the finest specimen he had seen in England, but whose dimensions are now surpassed by many Cedars in various parts of the kingdom. The Hendon, the Farley, and the Hammersmith Cedars were also trees of great size, and remarkable in their day. Of the oldest existing trees, are the two still remaining of the four originally planted in the Chelsea Garden, and the Cedar at Enfield. The highest Cedar in England is supposed to be one at Strathfieldsaye, which measures above one hundred and eight feet high, and the largest is said to be one at Syon, the height of which, in 1837, was seventy-two feet,

the diameter of the trunk, at three feet from the ground, eight feet, and that of the head one hundred and seventeen feet. To the numerous examples of the Cedar given in the "Arboretum Britannicum," we may add twelve or fourteen trees at Bayfordbury, Herts, the seat of —— Baker Esq., measuring from ten to twelve and fourteen feet in circumference near the base, at the age of ninety years; also a fine group at Scruton, near Bedale, Yorkshire; the seed from which these were raised is said to have been brought home by Dr. Pococke, the traveller, which, if correct, would make the trees nearly one hundred years old.

Before closing our account of the Cedar, and with it our work on "British Forest-trees," we may mention the introduction of the *Cedrus deodara*, a species belonging to this genus, which bids fair to prove a valuable acquisition, not only to the list of our ornamental, but to that of our most valuable timber trees. It is a native of the Himalayas, the mountains of Nepal, &c., where it grows at a great elevation, and attains a height and dimensions surpassing those of the Lebanon species, rarely, it is said, falling short of a height of one hundred and fifty feet, with a trunk of thirty feet or more in circumference. Its wood is also reported to be of first-rate quality, being compact, resinous, highly fragrant, of a deep rich colour, which has been compared to that of a polished brown agate; the grain remarkably fine and close, and capable of receiving a beautiful polish. It is also of the most durable nature, and instances have been mentioned where the timber of the *deodar* employed in buildings in which it had stood upwards of two hundred years, when taken down was found in no way impaired, but fresh and fit for further similar uses. As the species, in addition to the superior quality of its wood, is highly ornamental, and sufficiently hardy

to thrive in any part of Britain, even at great elevations, we hope to see it extensively propagated, and, in some degree, to become a rival to the larch. Great facility has been given to its propagation by the transmission of seeds from India by the shorter route now adopted *viâ* Egypt, &c., as they usually reach us without their vitality being affected, which was always the case to a great extent with cones subjected to a long sea-voyage. It may also be propagated by cuttings, which root freely, and promise to make as handsome trees as those raised from the seed. Its nursery culture and after treatment may be considered precisely similar to that of the larch.



LONDON:
PRINTED BY S. & J. BENTLEY, WILSON, AND FLEY,
Bangor House, Shoe Lane.